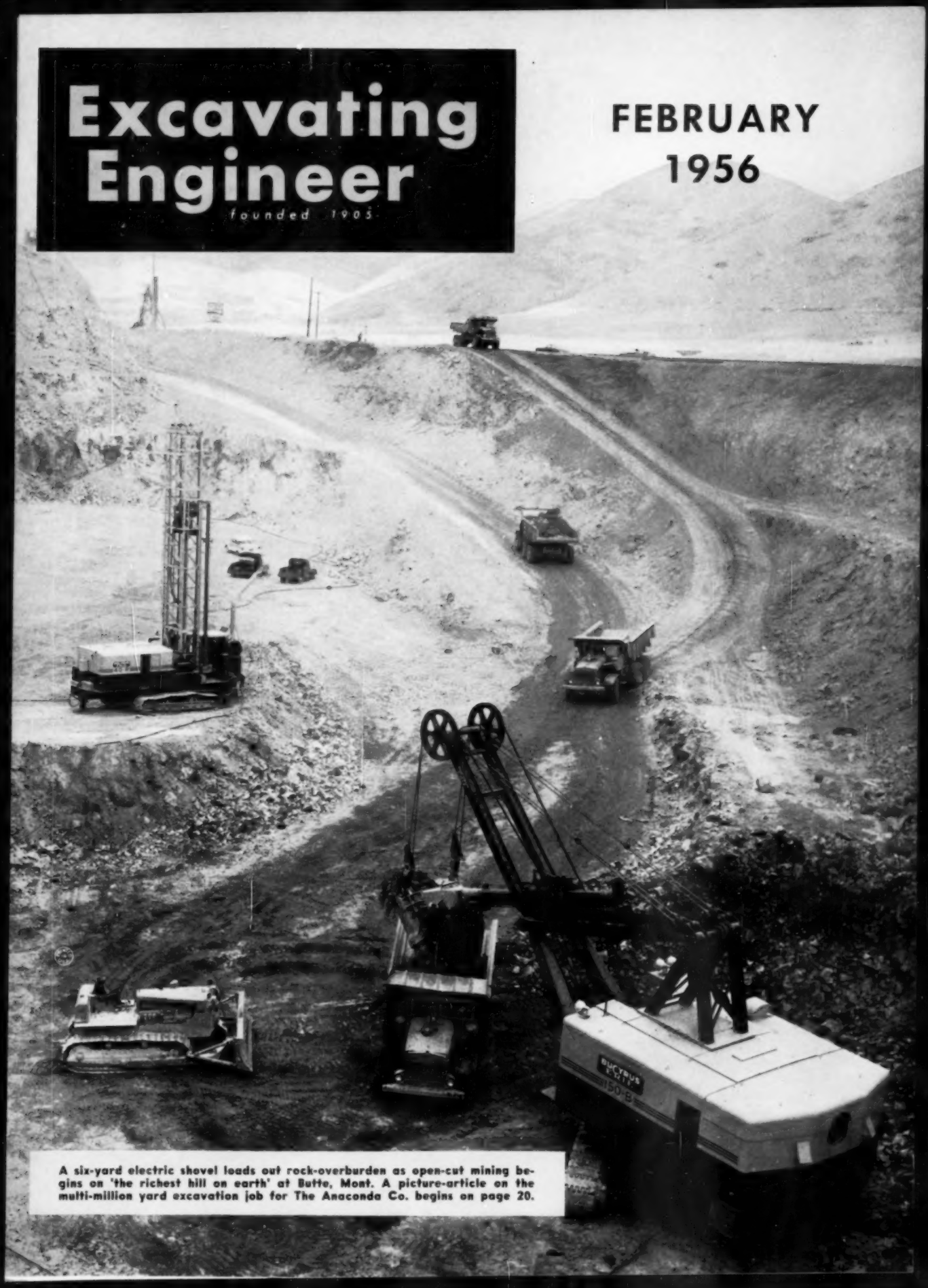
Excavating Engineer

founded 1905

FEBRUARY
1956



A six-yard electric shovel loads out rock-overburden as open-cut mining begins on 'the richest hill on earth' at Butte, Mont. A picture-article on the multi-million yard excavation job for The Anaconda Co. begins on page 20.

YOU GET MORE OF THE FEATURES YOU NEED MOST in a Bucyrus-Erie Transit Crane

HERE'S PROOF....

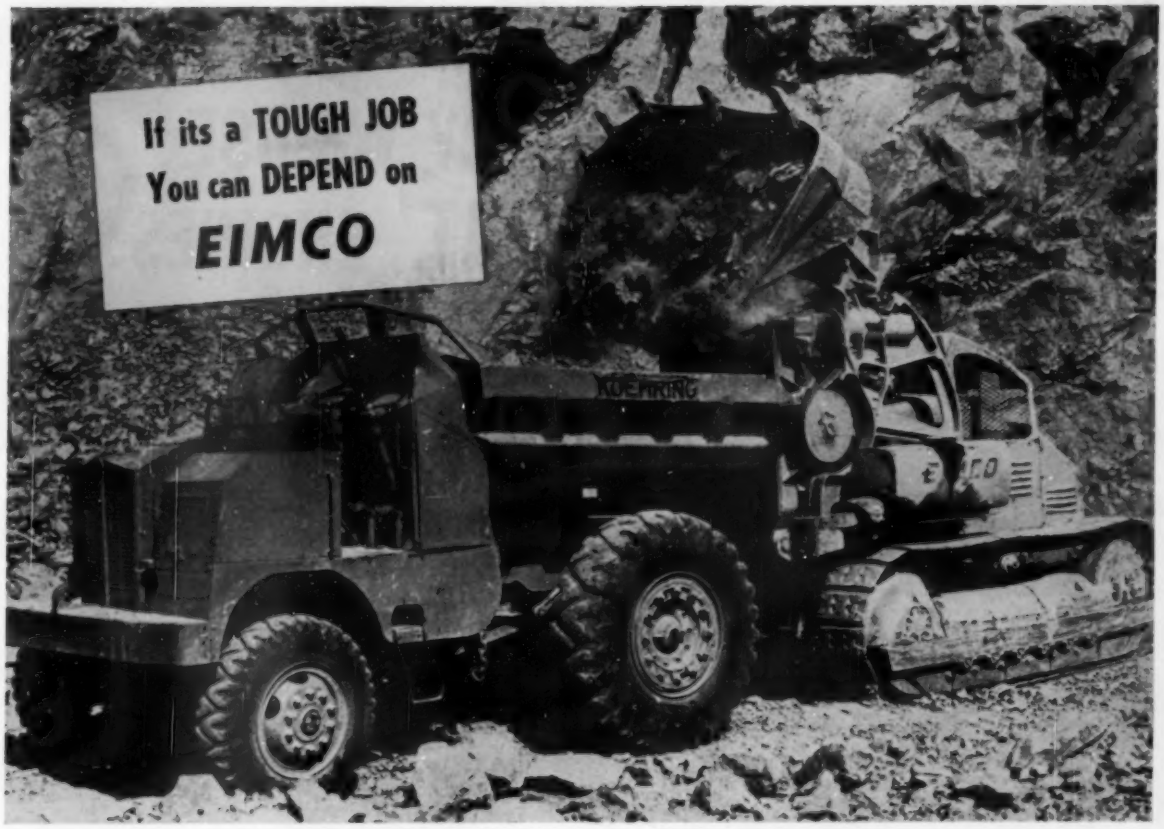
Your Bucyrus-Erie distributor can give you plenty more!

FEATURE	MODEL 15-B	MODEL 22-B	HOW YOU BENEFIT
Friction swing brake.	Standard	Standard	Operator can spot and hold boom point over desired position.
Power controlled lowering for main hoist line on lifting crane.	Standard	Standard	Provides high accuracy in lifting or lowering loads.
Independent power boom hoist with power controlled lowering.	Standard	Standard	Boom angle can be changed while machine is swinging or propelling, while load is being hoisted or lowered.
Open-throat boom design.	Standard	Standard	Permits rigging 2, 3, or 4 parts of line without removing sheave guards.
8-part pendant suspension.	Standard	Standard	Ideal for changing boom lengths conveniently and with minimum downtime.
Safety boom stops on all machines equipped for lifting crane service.	Standard	Standard	Added safety. Prevents boom from accidentally snapping over center and striking cab.
Boom angle indicator.	Standard	Standard	Enables operator to determine angle of boom at all times.
Full 3-side vision from operator's cab.	Standard	Standard	Gives him clear view of his entire operating range and of all men or obstructions in the vicinity.
16-part boom suspension.	Optional at extra cost	Optional at extra cost	Provides slower boom hoisting or lowering for even greater precision control.
Boom folding mechanism.	Optional at extra cost	Optional at extra cost	Booms over 60 feet long can be carried folded on job-to-job moves.

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

126E55C



Hard, Rough, Tough Jobs Need Eimco Dependability

This case study concerns one Eimco 105 loader on which an open pit mine depends for its entire production.

Location — in an isolated and remote area of Southwest Africa.

Conditions — dusty, dry and hot. Pit floor uneven-solid rock.
Mining — selective
Operators — native
Maintenance — Nil

Report — The Eimco 105 Tractor Excavator has operated some 3200 hours on consecutive two shift basis under the most difficult conditions. Native operators are unnecessarily abusive of the equipment. The ore is exceptionally abrasive and heavy. No other loading equipment is available so the Eimco must stay on the job. One operator ran the 105 a complete shift without fan belts, both of them run the machine to the solid rock wall and spin the tracks when cleaning out an ore pocket.

Eimco does not recommend abuse on their tractor-excavators or any other equipment but Eimco produces a machine that can stay on the job day in and day out—month in and month out—when you are depending on it and when plant capacity depends on a single production loading unit.

There are many reasons for Eimco superiority on the tough jobs. The design of an Eimco is simple-strong. The material of construction is all alloy steel. The operating features make it the easiest tractor to operate and the most maneuverable. When you need guts in a tractor, compare an Eimco with anything you are using or have used previously.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Pasadena, Calif. Houston, Texas Vancouver, B. C. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

EIMCO

B-173

"3 REASONS WHY WE USE CAT* ENGINES:

1 All the power we need to do the job easily.

2 Maximum dependability with minimum good care.

3 Operators prefer Cat power to work with."

NELSON ARMSTRONG, *Supt.*
Maxwell Bridge Co.

THOSE three reasons tell why Maxwell Bridge Co., of Columbus, Kansas, powers its cranes and excavators with Caterpillar Diesel Engines. The Koehring Crane shown here, placing I-beams for a bridge 5 miles west of Emporia, is one of 12 machines owned by Maxwell. Its engine? A Caterpillar D318, with well over 4000 hours on the meter.

Operators who have worked for this company from 8 to 25 years are particular about their power. Busy all year around, each man services his own machine. Naturally they want an engine that stays on the job without tinkering—and when they're asked to name their preference, they choose Caterpillar.

Most manufacturers of excavating equipment can supply Cat Diesels as original power. Or Caterpillar Dealers are ready to install these dependable engines as replacement power. A full line of engines is available. The D318, for example, is rated at 137 HP (maximum) at 2000 RPM.

For the power you need and for service and parts you can trust, call your Caterpillar Dealer. He's as near as your telephone.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

MODERN HEAVY-DUTY DIESEL ENGINES

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Excavating Engineer

founded 1905

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HARLLEE BRANCH, JR. *Portrait by Fabian Bachrach*

"We consider it a privilege to make the Payroll Savings Plan available to all our people"

As President of Georgia Power Company, Mr. Harllee Branch, Jr., can be proud of his company's Payroll Savings Plan—more than 50% of Georgia Power's employees are Payroll Savers. They are putting more than $423,000 into U.S. Savings Bonds each year. But, Mr. Branch's interest goes beyond his own company Plan. A few months ago, as President of the Edison Electric Institute, he asked all the 185 member companies in the electric utility industry to join in an industry-wide effort to increase employee percentages in their Payroll Savings Plans.

First results of the industry campaign are now coming in. Gulf Power Company has reached 87.3% employee participation... Utah Power and Light employees have enrolled 69.6% . . . Wisconsin Electric Power reports 69.8% . . . Wisconsin-Michigan Power Company, 62% . . . Wisconsin Public Service, 57.6% . . . Lake Superior District Power, 52%.

Has every employee in *your* company been offered an opportunity to enroll in the Payroll Savings Plan? If not, communicate with Savings Bond Division, U.S. Treasury Department, Washington, D.C. Your State Sales Director will show you how easy it is to conduct a person-to-person canvass.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

EXCAVATING ENGINEER

57 NORTHWESTS

—more than any other make of SHOVEL · CRANE DRAGLINE or PULLSHOVEL

attests to the acceptance of Northwest equipment when output and dependability are at their greatest in importance.

and remember

- Well over 100 Northwests—more than any other make—on the New York Thruway.
- Over half the shovel equipment on the West Virginia Turnpike was Northwest.
- Over 60 Northwests on the Ohio Turnpike.
- Over 20 Northwests on the Maine Turnpike extension.

NORTHWEST ENGINEERING COMPANY
1506 Field Bldg., 135 South La Salle St.,
Chicago 3, Illinois

A new Northwest 80-D, one of the latest of the 22 Northwests that have been owned by the Elmhurst Contracting Co., of Corona, L. I., New York. Elmhurst is one of the many Northwest users on the Massachusetts Turnpike.

YOU CAN'T HAVE NORTHWEST ADVANTAGES UNLESS YOU OWN A NORTHWEST

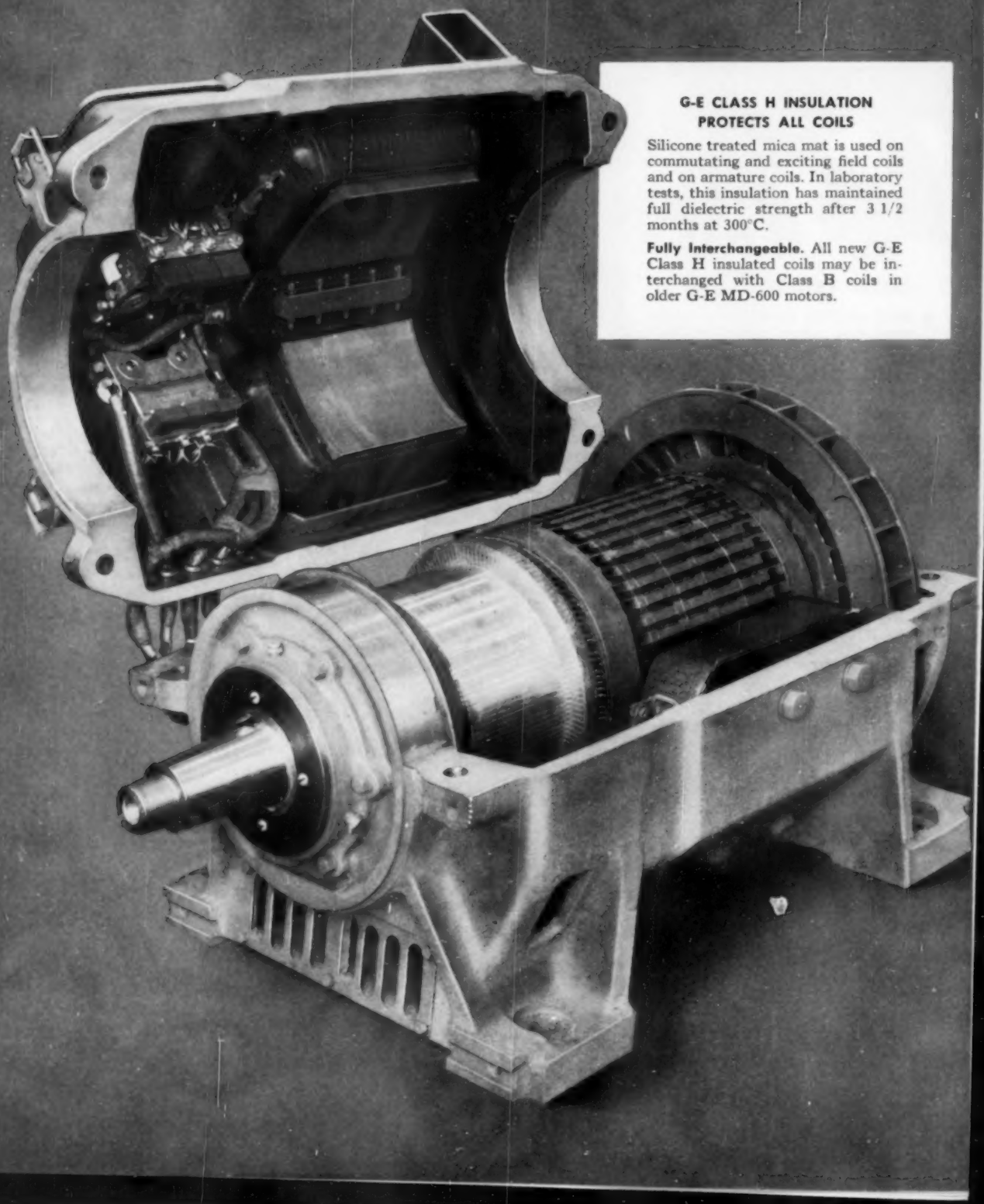
NORTHWEST

CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

PROGRESS IN
DIRECT-CURRENT DRIVES

NOW! Roastouts

NEW G-E MD-600 MOTORS



G-E CLASS H INSULATION PROTECTS ALL COILS

Silicone treated mica mat is used on commutating and exciting field coils and on armature coils. In laboratory tests, this insulation has maintained full dielectric strength after 3 1/2 months at 300°C.

Fully Interchangeable. All new G-E Class H insulated coils may be interchanged with Class B coils in older G-E MD-600 motors.

Virtually Eliminated on . . .

WITH CLASS H INSULATION

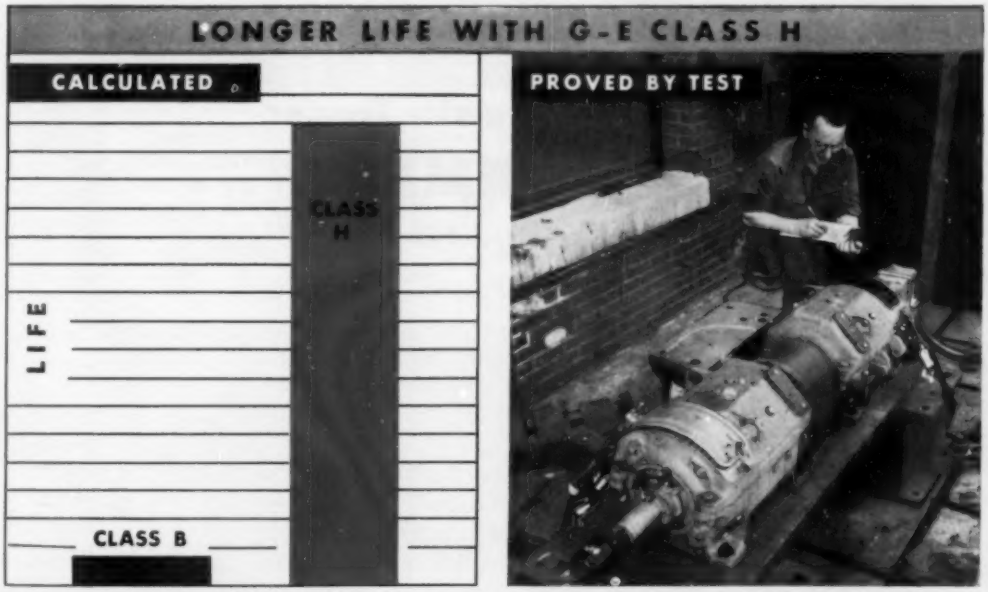
G.E. offers—in all MD-600's—Class H Insulated Coils

WHAT IS CLASS H? General Electric research has developed a combination of inorganic and silicone materials for a new insulation system now used in all MD-600 motors. These Class H materials will withstand temperatures up to 180°C continuously.

BETTER FOR HEAVY DUTY. Auxiliary mill motors often encounter unexpected high ambient temperatures, unforeseen extended duty or emergency conditions. Any one of these can cause "roastouts" from temperatures higher than the insulation capacity. The new G-E Class H insulation will resist up to 50°C more than Class B, resulting in longer motor service.

REWINDS ELIMINATED? On normal duty, insulation failure may be eliminated as the limiting factor in continuous armored motor service. Engineers calculate that each 10°C rise in temperature reduces the life of a given type of insulation by half. *Since G-E Class H will withstand 50°C higher than Class B, its life* **at the same temperature** *should be increased 2^5 or 32 times!*

YOUR G-E SALES REPRESENTATIVE HAS COMPLETE INFORMATION. Contact him at your nearby G-E Apparatus Sales Office, or write Section 812-1, Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.



ENGINEERING STUDIES indicate that under identical operating conditions new G-E Class H insulated coils in MD-600 motors will last up to ***32 times*** as long as conventional Class B coils. Insulation failure may be eliminated as the limiting factor in continuous auxiliary mill motor service.

ACTUAL TEST with Class H and Class B motors coupled together ***proves to date*** the new insulation will last more than twice as long as the old. After burning out two Class B insulated motors, the one with Class H coils is still operating under exaggerated load, vibration and atmospheric conditions.

Progress Is Our Most Important Product

GENERAL ELECTRIC

IN MINES and QUARRIES

Here's Paul and Richard Slattery's new HD-11, pulling a 7½-yd Allis-Chalmers scraper on an eleven-mile road-rebuilding job between Savannah and Whitesville, Missouri.

Allis-Chalmers HD-11 Crawler Tractor

"BIG PERFORMER"

says Missouri contractor

That's co-owner Dick Slattery talking about the newest addition to his spread of Allis-Chalmers equipment.

"The HD-11 has given excellent performance and requires little maintenance," Dick goes on. "Among a lot of good things, I think the engine is tops. The lower RPM for one thing will give the tractor longer life. And its lugging power is terrific."

Chalk up another enthusiastic user of the new HD-11. And Dick knows what he's talking about. He started in business building farm ponds and clearing land with an army surplus Allis-Chalmers tractor in 1946. Now, with his father, he owns three crawlers, two big motor graders and a 7.5-yd scraper — all Allis-Chalmers.

Stop at your Allis-Chalmers Construction Machinery Dealer . . . see for yourself why the great new HD-11 is making such an impression on dirt movers like Dick Slattery.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

HD-11 owners know you just can't beat the combination of advanced-design features the HD-11 offers. The new engine with "follow-through" combustion . . . new long-life, ceramic-lined clutch . . . tough new track . . . all-steel box-A main frame . . . unit construction . . . lube features that let you leave a grease gun home for one to two weeks . . . these are just some of the many advantages that together add up to the finest tractor in its class.

HD-11
75 drawbar hp
20,500 lb

HD-11G
105 net engine hp
32,000 lb
2¼-yd bucket capacity

IN MINES and QUARRIES...

ON BIG CONSTRUCTION PROJECTS

Preparation Costs Go Down When Bucyrus-Erie Rotaries Move In

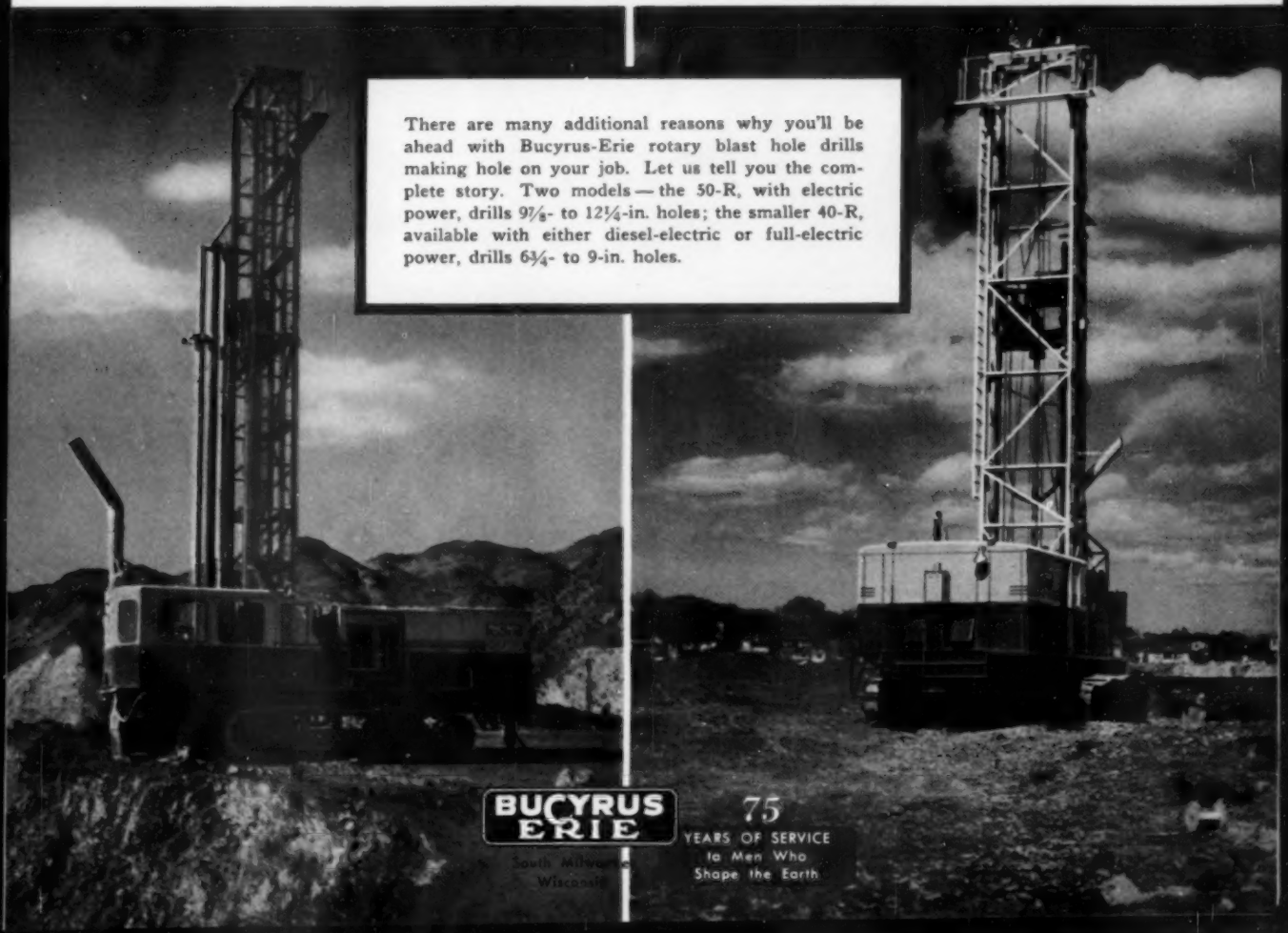
Wherever big diameter blast holes are called for, Bucyrus-Erie rotary drills are top choice. Drilling in many types of difficult formations, they have repeatedly demonstrated they can prepare material economically. Production figures in mines and quarries and on big construction jobs show a sharp reduction both in direct drilling cost and in cost per ton of material broken when Bucyrus-Erie rotaries go to work.

You're ahead on cost per lineal foot of hole because these rotaries drill large diameter holes faster than other machines drill small diameter holes. Operating control is completely flexible for producing the right combination of rotating speed and pulldown pressure that is most effective in the formation encountered.

You're ahead on cost per ton broken because large-diameter rotary drilled holes permit economical blasting procedures. The big-hole drilling technique requires fewer holes to bring down a given volume of rock or ore. It produces excellent fragmentation without increasing the quantity of explosive, and reduces the need for secondary blasting.

32856C

There are many additional reasons why you'll be ahead with Bucyrus-Erie rotary blast hole drills making hole on your job. Let us tell you the complete story. Two models — the 50-R, with electric power, drills 9⅞- to 12¼-in. holes; the smaller 40-R, available with either diesel-electric or full-electric power, drills 6¾- to 9-in. holes.



BUCYRUS ERIE

South Milwaukee Wisconsin

75 YEARS OF SERVICE to Men Who Shape the Earth

Best way to make your contracts pay—

SPECIFY GM

in all your Construction Equipment

PRODUCTION UP 30%—FUEL COSTS CUT 30%

Arizona Sand & Rock Company replaced a 4-cycle Diesel with a 2-cycle GM Detroit Diesel on this pug mill. Despite clouds of dust, maintenance costs dropped 25%—and production control is better with fast-acting, 2-cycle Detroit Diesel power.

KEEP 600,000-YARD CONTRACT GOING

Marsolino Construction Co. relies on GM Detroit Diesel-powered Ingersoll-Rand Gyro-Flow compressors to keep this 600,000-yard contract moving. They report the Detroit Diesels "start easily—are dependable and economical."

CUTS FUEL COSTS 40%—UPS PRODUCTION 25%

When Miami's R. E. Vaughan, Inc. switched from a 4-cycle Diesel to a 2-cycle GM Detroit Diesel on this ditcher, production jumped 25%—fuel costs dropped 40%. They report the Detroit Diesel delivers more power at less cost, too.

TRAVELS 35 M.P.H. ON THE HIGHWAY

Speed like this *between* jobs means more time on the job for this GM Detroit Diesel-powered Warco grader operated by Michigan's Henry Schmid Sons. Company's Detroit Diesel-powered dragline has worked over 17,000 hours on $100 for repairs.

Name the construction equipment you need—and it's a sure bet that you can get it powered with a General Motors Detroit Diesel.

For more than 150 manufacturers offer GM Detroit Diesel power in over 1,000 different applications—*because it's America's first choice Diesel!* With their reputations riding on every piece of equipment they sell, it's certain these manufacturers pick the best Diesel available to power their products.

And when you specify a GM Detroit Diesel in your construction equipment you get a Diesel that costs less to buy, less to run, and less to maintain.

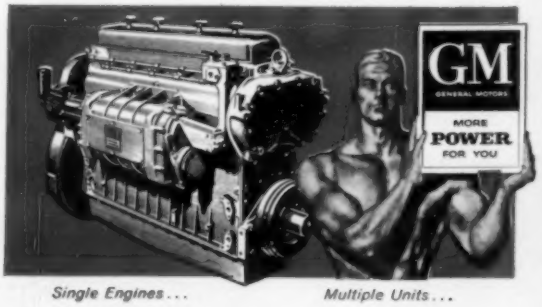
You get a Diesel that delivers more power from a smaller, lighter engine.

And you get a Diesel backed by a nationwide network of GM Detroit Diesel Distributors ready to give you fast service and quick delivery of low-cost parts *day or night.*

Your local GM Diesel Distributor or dealer can give you the list of equipment powered with GM Detroit Diesel engines. Call him today or write direct.

DETROIT DIESEL

Engine Division of General Motors, Detroit 28, Michigan



Single Engines . . .
30 to 300 H.P.

Multiple Units . . .
Up to 893 H.P.

AMERICA'S LARGEST

DETROIT DIESEL POWER

NO REPAIRS IN 10,000 HOURS

In 1951, Minnesota's Phelps-Drake Construction Company bought a GM Detroit Diesel-powered Lima Paymaster. And in 1953, they bought a second Paymaster plus a Wellpoint pump—both GM Detroit Diesel-powered. At last report none of the engines had any repairs, were still going strong after more than 10,000 hours. Phelps-Drake also reports production is high—fuel cost low—with Detroit Diesel power.

BUILDER OF DIESEL ENGINES

CONCRETE bucket is under finger-tip control of the operator of this 22-B Transit Crane. Boom is 80-ft. long with a 20-ft. jib. Booms are available with bolted butt-type joints (standard equipment) or pin-connections (extra equipment at added cost).

Here's Concrete Handling Speed For Your Long-Boom Jobs

You can count on Bucyrus-Erie Transit Cranes for speed and reliability on your long-boom concrete pouring jobs because they give you the kind of boom control you need for continuous up-and-down booming.

Boom hoist is instantly available. Boom angle can be changed while the machine is swinging, or while the load is being hoisted or lowered. All the operator has to do to change the boom angle is to engage the boom hoist lever and the boom starts to move — no need to shift gears or mesh jaw clutches.

Designed for safety, the Transit Crane boom hoist is a power-controlled lowering type that ties operation of the boom to the main machinery and limits speed in the lowering direction. It leaves the brake free for the final stop — the operator does not have to drag the brake all the way down. Heavy-duty boom hoist machinery has full ability to handle heaviest loads recommended for the machine.

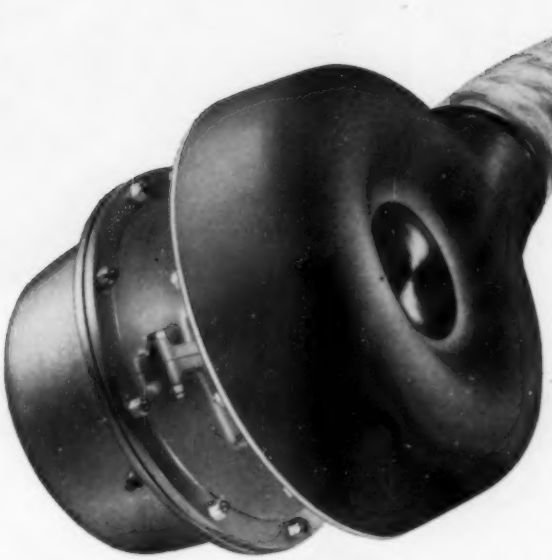
There are many other features, which contribute to crane accuracy, and which Transit Cranes bring you as standard equipment. See your Bucyrus-Erie distributor now for full information on the 25-ton capacity 22-B Transit Crane, convertible to ¾-yd. excavator; and the 15-ton capacity 15-B Transit Crane, convertible to ½-yd. excavator.

204E56C

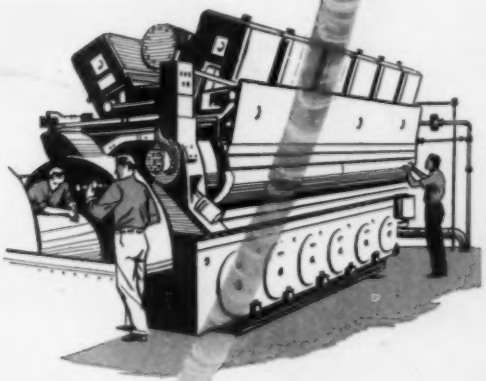
BUCYRUS ERIE

South Milwaukee, Wisconsin

STRUCTURAL steel erecting is a "natural" for the Transit Crane with its precision control. Four hundred tons of steel were set in four days by this Transit Crane at an industrial plant under construction in Erie, Pa.



MORE DRIVE for your diesel!



Here is how the application of AiResearch Turbochargers can affect the performance of your mobile or stationary diesel equipment:

✶ Adds more power in relation to size and weight than any other units in this field.

✶ Decreases fuel consumption. Besides decreasing costs, this factor greatly increases the non-refueling range for mobile equipment.

✶ Provides power as needed by responding rapidly to acceleration requirements. This factor greatly decreases smoking.

✶ Maintains sea-level power under all altitude conditions.

✶ Greatly reduces the noise level of your equipment while eliminating power-wasting mufflers.

AiResearch is the largest producer of small turbomachinery in the United States. Twenty-five *million* hours of experience in deriving exceptional power from small units is the background for the development of the AiResearch Turbocharger. This power package was recently applied to Caterpillar diesel machinery with startlingly effective results.

Your inquiries are invited.

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY

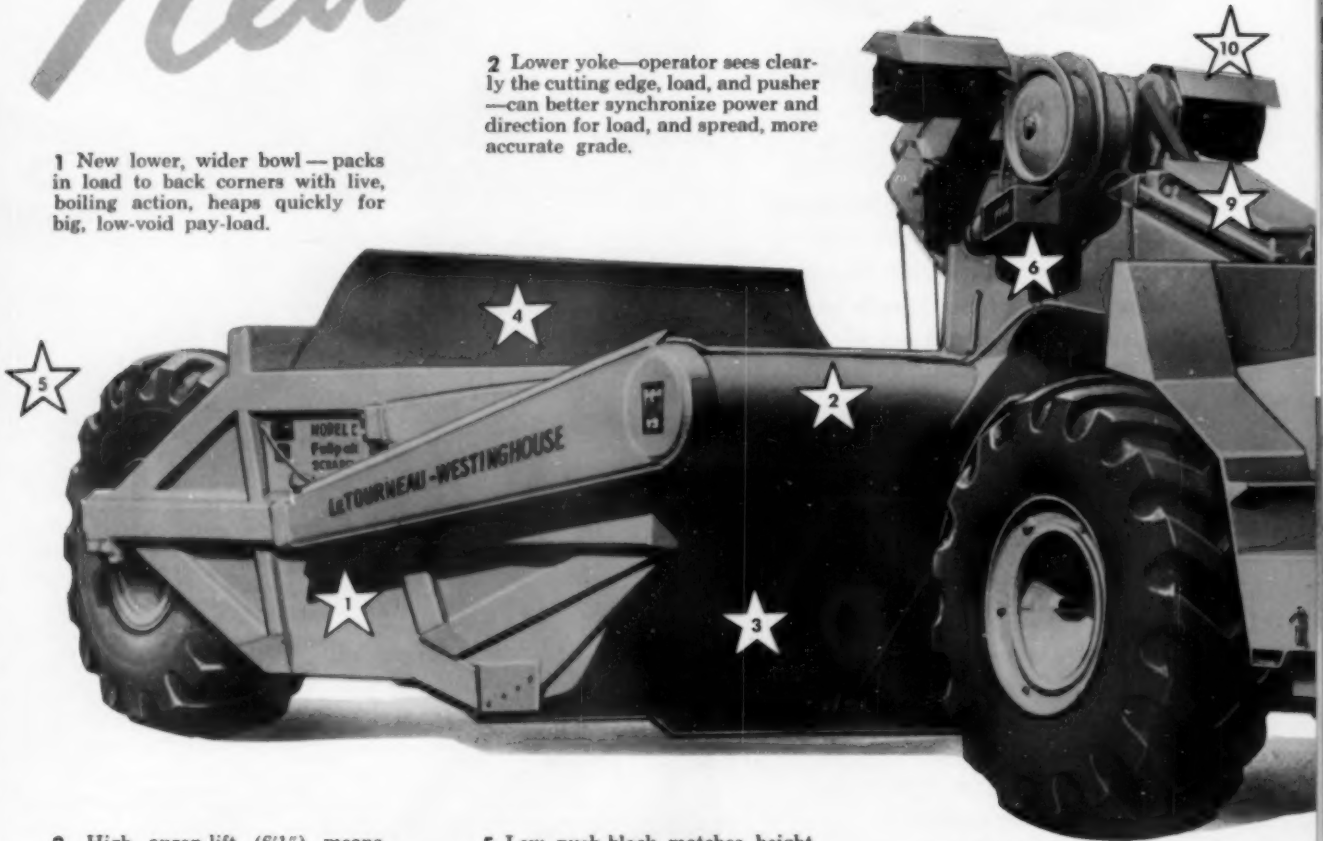
Low, wide bowl of Fullpak Scraper with 9¼' blade gives live, boiling action that quickly fills back corners, heaps high fast for big payloads.

Fullpak Scraper is ruggedly built, with double-steel bottom reinforced by welded steel filler-channels. Box-beam construction reduces dead-weight, increases strength. Sturdy push-block (43" x 16") pushing directly to blade through scraper-bottom, maintains contact with pusher over rough or bumpy ground.

New Model C Fullpak

1 New lower, wider bowl — packs in load to back corners with live, boiling action, heaps quickly for big, low-void pay-load.

2 Lower yoke—operator sees clearly the cutting edge, load, and pusher —can better synchronize power and direction for load, and spread, more accurate grade.



3 High apron-lift (6'1") means fast, easy unloading of chunky materials and rocks.

4 Positive forward-ejection of load, wipes bowl clean of all materials, including mud and sticky clay.

5 Low push-block matches height of crawler-tractor push-plates, applies power in direct line with cutting-edge to utilize full horsepower and tractive effort.

6 Quick-release clutch on scraper, with fast electric hoist, permit rapid "pumping" action of bowl, for speedy loading of loose materials.

7 Powerful 208 hp C Tournapull prime-mover—with constant-mesh, or sliding-gear transmission — has speeds to 30 mph.

8 Exclusive, power-transfer differential matches pull to traction, makes Tournapull best "mudder" in the earthmover field.

Tournapull, Rooter—Trademark Reg. U. S. Pat. Off., Fullpak—Trademark

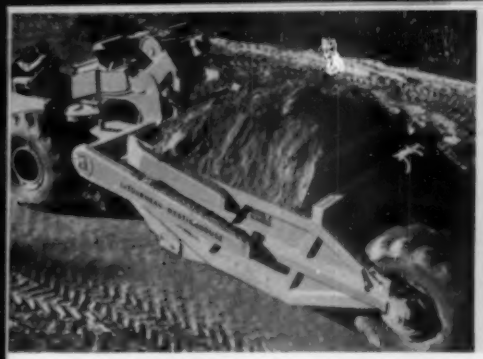
Tractors

Rear-Dumps

Graders

TraveLoaders

Bottom-Dumps, Cranes, Flat-Beds, Elegraders, Rollers, Snow Plows, Logging Arches and Skidders, Scrapers and PCU's, Rooters, Root Rakes, Wire Rope

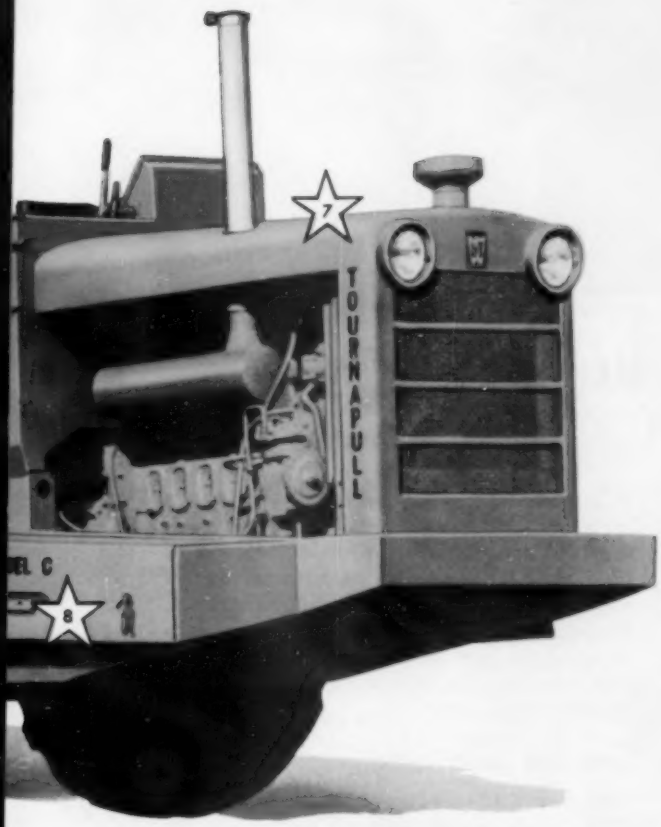


Curved deflector-plate on top of tail-gate, together with curved apron, give best boiling action for fast heap, eliminate spill, help fill corners. Wheels inside cutting edge make precision work possible next to banks and on slopes.

Big 208 hp Model C Tournapull prime-mover with Fullpak Scraper makes 180° turn in 31' 2", rides on 4 big 26.5 x 25, 26-ply rating, low-pressure tires, travels up to 30 mph over highways and cross-country.

Scraper *18 cu. yards heaped*

Loads faster... boils better...



9 Power-steer on geared king-pin permits 90° turn, swings prime-mover side-to-side in soft going, placing drive-wheels on firm footing to "walk" out of mire.

10 Push-button control makes handling easy. Brushless, all-weather electric motors at point-of-action give instant steer-and-scraper control, minimize cable needs.

You've never seen a scraper that loads as *easy* and heaps as *fast* as this new LeTourneau-Westinghouse Model C Fullpak Scraper.

New Fullpak low, wide bowl, loads up to 18 cubic yards heaped capacity with minimum of loading resistance. Low push-block matches height of tractor push-plates. Direct line application of power from pusher to blade, makes easier, faster loading.

The "low and wide" design of this new Fullpak Scraper helps get more "boiling" action, makes it easy to fill back corners as well as apron, packs in a big load *fast*. Wheels are inside cutting edge, for precision finish work next to banks and on slopes. Positive, forward ejection forces out sticky as well as dry material ... wipes bowl clean each load. High apron lift (6'1") permits all material to be quickly and cleanly unloaded. Fullpak Scraper spreads in accurate lifts to meet any construction requirement.

Powerful, improved 208 hp Model C Tournapull prime-mover has the famous power-transfer differential that keeps pulling-traction on both drive wheels at all times ... also geared king-pin power steer that can turn 90° and "walk" Tournapull out of mud and loose sand that stalls ordinary prime-movers. You have top speeds to 30 mph, with choice of sliding-gear or constant-mesh transmission.

This new 18-yard, faster-loading Fullpak Scraper means more pay yards for you

Before you buy your next scraper, get full information on this new Fullpak 18-yard C Tournapull. Contact your local Distributor for complete details.

P-1024-G

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Trench hoe solves difficult problem at Oahe Dam

Shale loading speeded up with use of trench hoe

Ingenuity always pays off — as it is for Pierre Constructors, excavating the stilling basin at Oahe Dam, Pierre, South Dakota. Approximately 114 thousand yards of tough shale must be excavated for construction of the huge basin.

Early phases of this excavation were handled with a shovel but Pierre Constructors realized that precise side wall cuts and accurate grade levels were not feasible by this method. H. B. Bruce, Project Manager for Pierre Constructors, pioneered the thought that a Manitowoc 1¼ Yd. trench hoe could do the job. The hoe has been operated from above and to the sides of the cuts and has not been confined to operation into the face of the excavation as a shovel would be. The results speak for themselves. More yardage has been removed and more important, accurate grades and precise faces have been maintained throughout the project.

Boom stiffness, unusual stability, and power to spare allow this hoe to work from any position and excavate shale without the need of blasting. The versatile Manitowoc uses a maximum of four passes in two minutes time, loading 6 Yd. trucks. Smooth torque converter drive plus air controls enable the operator to handle anything the bucket encounters with ease.

HOE HAS MANY OUTSTANDING FEATURES

This sturdy Manitowoc Hoe can dig down to 25′6″, reach out 38′ and can dump into the trucks with ease at any loading level. Extremely mobile, the 1¼ yd. Model 2000 can be moved as easily as a small machine. The counterweight is self-removing, enabling the hoe to be trailer moved across country — from job to job — and of course can be easily converted to shovel, crane or dragline as the operation requires. Full information on this unit, as well as sizes ranging up to 5½ yd., may be obtained from the MANITOWOC ENGINEERING CORP., MANITOWOC, WIS.

How to get bigger loads in sand

Sand is loose, shifting, highly-abrasive . . . difficult to load, hard to haul through, tough to spread . . . slow and costly to handle. But with the right equipment — and know-how — sand can be moved at a profit.

Use wide-base sand tires. Special low-pressure, wide-base tires are available for working in sand. These tires have tough, flexible sidewalls. They are wider than ordinary earthmoving tires. They spread out over a larger area to give better flotation. Their shallow, rounded tread does not dig in.

These tires are designed to operate with extremely low pressures. For example, a D Tournapull, equipped with 65″ sand tires, works at pressures of 10 to 20 pounds in dry sand, and 15 to 20 pounds in moist sand.

Sand has a tendency to run ahead of the scraper blade and apron. The rounder, finer, and drier the particles, the worse this condition becomes. When loading sand, follow this method for best results:

Go into the loading area fast, lowering the blade slowly and picking up as much sand as possible by using the momentum of the machine. This will fill the hard-to-reach rear area of the bowl, and is especially effective for rubber-tired prime-movers loading in second or third gear.

Rolling resistance in soft, loose sand is higher than in any other material. Wide-base drive tires provide plenty of flotation.

Then shift into lower gear to match pusher-tractor speed (if one is being used), and pump the bowl up and down. For best results in pumping, drop the blade as scraper wheels roll into the depression made by the previous pump, and raise the blade as the wheels are climbing out of it. *To top out the load,* drop bowl deeply two or three times as you near end of the loading area.

Get what you can and run. Where hauls are 200 ft. or less, don't waste time trying to get the extra half-yard. Many times that extra half-yard means an extra 30 seconds in the cut. In the same half-minute, your scraper could travel 500 ft. On very long hauls, however, where load time represents a much smaller fraction of the cycle, it *may* pay to try for that extra half-yard or yard. Where the balance point is close, it's a good idea to time your cycles and estimate your pay load carefully.

Spread on the run. Sand flows freely and can be spread at high speed in thin layers. High-speed spreading also takes advantage of momentum of the hauler to keep the machine from digging in and bogging down on loose fills.

Spread "on the run." This prevents sand from piling up in front of scraper, speeds distribution of load.

For free copies of this article, write LeTourneau-Westinghouse Company, Peoria, Illinois. Please state quantity desired.

Tournapull—Trademark Reg. U.S. Pat. Off. G-741-OP-bw

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Here's the New R-15 "Euc"

that sets a new high in 15-ton Rear-Dump Performance!

DUMPS FAST AND CLEAN

Smooth body interior and tapered rear chute assures clean shedding of the load well back of the rear wheels—an important feature for dumping into hoppers or over the edge of waste banks. Lycoming Silica Sand Co. in Pennsylvania has used 15-ton "Eucs" for years and now has added two R-15 Rear-Dumps to their hauling fleet.

STAY ON THE JOB LONGER

Victorville Lime Rock Co. in California uses 2 Model R-15 "Eucs" for hauling rock and overburden. Rugged body and frame withstand the impacts of loading, hauling and dumping heavy excavation in construction, mine and quarry service.

Built for heavy off-the-highway service, 15-ton Rear-Dump "Eucs" have paced the field for over 20 years. They've reduced hauling costs on hundreds of the toughest jobs in mine, quarry and construction work . . . delivered "plus" performance year in and year out.

This model R-15 incorporates the engineering advances, the easy operation and maintenance features, resulting from unequalled field experience with other Euclid Rear-Dumps of the same capacity. It provides the dependable work-ability that means more payloads per day at lowest cost per ton or yard moved.

Have your Euclid dealer give you full details on this new 15-ton Rear-Dump and the complete line of Euclid earth moving equipment. He'll be glad to show you why so many users have proved for themselves that ***Euclids are your best investment.***

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

The R-15 is your BEST BET for Lower Hauling Costs!

Advanced design results from 20 years of leadership in building off-highway Rear-Dumps

Some of the* OUTSTANDING FEATURES *of the R-15

- 10½ yd. body 30,000 lb. payload
- 218 h. p.
- loaded top speed of 25 m.p.h.
- hydraulic booster steering
- air assist clutch
- free floating springs
- 14.00 x 24 drive tires (16.00 x 25 optional)

POSITIVE CONTROL OF DUMPING

Double-acting 3 stage Euclid hoist and hydraulic system gives the operator fast, positive control of the body position at all times. Dumping angle of the body, in fully raised position, is 68°. Body, frame and hoist are designed and built as an integral unit. McDowell & McDowell are using six R-15 "Eucs" to haul heavy excavation at a big plant site job in Nashville, Tennessee.

SPEED AND STABILITY

The 5 speed transmission and Euclid planetary axle provide a top speed of 25 m.p.h. with full 15 ton payload . . . 27 m.p.h. with 16.00 x 25 tires. Free floating Euclid spring suspension gives maximum stability empty or loaded under all road conditions . . . permits faster safe travel speeds. Dale Bloom had a fleet of 6 Rear-Dump "Eucs" on this Kansas Turnpike job—2 of them the Model R-15.

EASY OPERATION

Full width cab offset to left for maximum vision, air assist clutch, booster steering, 218 h.p. engine, fast acting hoist, free floating springs and fully adjustable seat contribute to driver comfort and easy operation. Four of these new Rear-Dumps worked on a highway relocation job of W. J. Menefee Construction in Missouri.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

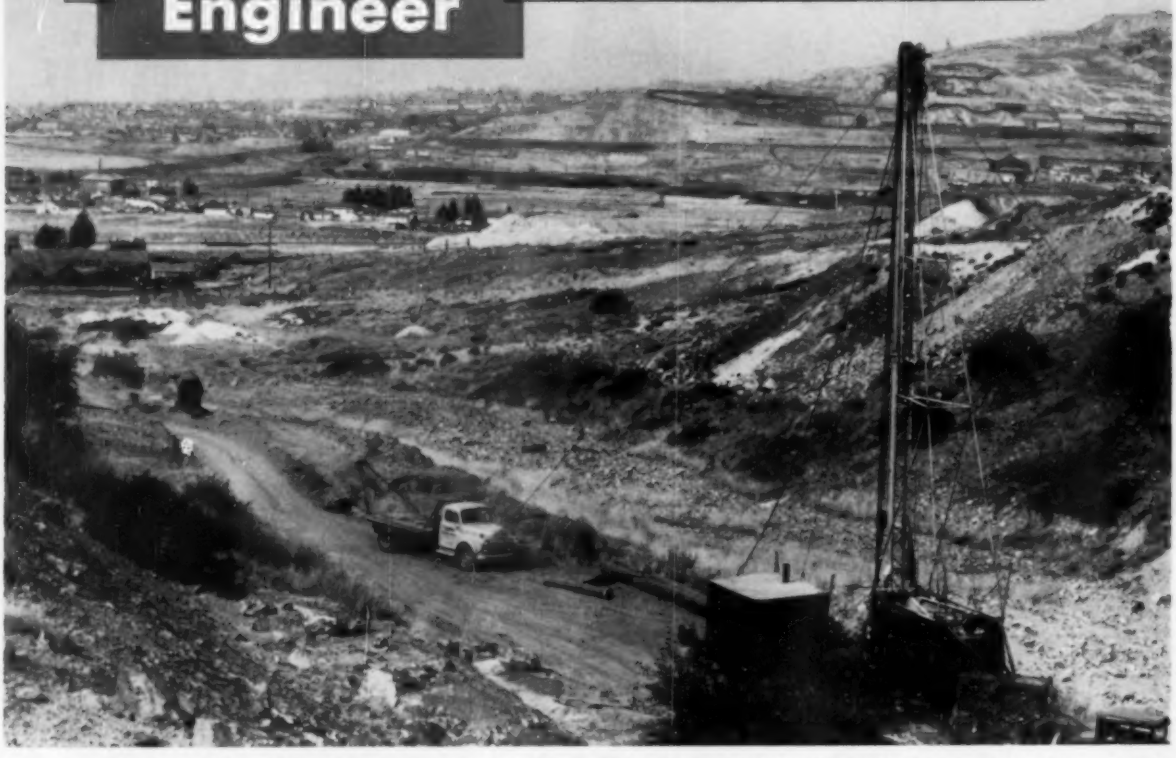
FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

The K-13 is your BEST BET for Lower Hauling Costs!

Excavating Engineer

founded 1905 FEBRUARY, 1956



A Bucyrus-Erie 28-L churn drill is in foreground of picture which shows "Richest Hill on Earth" at right, Butte at left.

It's Still 'Richest Hill on Earth'

by Ray Day

THE "richest hill on earth" is richer than it was in 1900. The truth of that statement is unfolding all over Anaconda Company's copper camp at Butte, Mont. Approximately 100 million tons of open pit-type copper ore are known to exist. Extensive exploration is under way to check other suspected reserves and to verify geological findings made in the past. The Anaconda Co. also has started several open cuts in the richest hill on earth.

Exploratory drilling and a sizable excavation job have been let to private contractors. Although Anaconda has a limited amount of diamond-drilling exploration under way to the west, most of the exploration work is being done by Bucyrus-Erie churn drills owned by Lyon Drilling Co. of Los Angeles, Calif., and Phoenix, Ariz. The first excavation contract was let to the F & S Contracting Co. of Butte. A merger of modernized, ingenious contracting with some of the most modern thinking now practiced in contemporary mining circles has been effected. Together, they create an excavation and mining story reminiscent in every respect of those raw, lusty days of long ago when men gambled their fortunes, their professional reputations and even their lives against fabulous riches hidden deep under the hill.

Three types of mining are in progress at Anaconda Hill. The shaft and stope-mining method, expensive but justified where rich ore lies far beneath the surface, still is practiced extensively. Several years ago the block-caving method was introduced. It is especially suited where a large body of ore is found, even if it is far underground. Since the block-caving scheme is usually more economical than the stope-mining method, it can be used by Anaconda for recovering somewhat lower-grade ores.

In the open-cut method, of course, the overburden is stripped from the surface of the ground over the orebody, exposing the ore for surface mining. This is the cheapest method of all when the overburden is light. Open-cut mining, however, quickly reaches a point of diminishing return economically if the overburden is too thick. Anaconda's geologists hope to learn from the current extensive exploratory - drill-

Mineral reserves larger than previously known are being explored as The Anaconda Co. contracts extensive drilling and excavation. Several open cuts have been started at Butte site.

ing program the exact depth of this overburden. It appears likely that many areas in the richest hill on earth will lend themselves to the open cut method.

Geology of the Butte area is quite similar, so far as copper-deposit characteristics are concerned, with the Ruth-Ely copper mining section of Nevada. Butte's copper ore grew from a secondary enrichment of an orebody beneath the earth's surface. In the geological past, the overburden (a granite rock) contained the original copper in the form of pyrite, chalcopyrite and chalcocite. Over a period of time, surface water leaching through the rock absorbed the copper sulphites in solution and redeposited them in altered form. Generally, the copper sulphites were redeposited at a lower depth by covering certain iron sulphites which existed below the cap rock. It is this secondary enrichment which makes 1956-model copper ore.

The mining company's big problem is how to get at the secondary enriched zone, taking into account the leached-capping zone which lies next to the ground surface. Below the orebody is a pyrite zone, which also is being explored to some extent by the Lyon Co.

What laymen associate mostly with Butte's rich hill is copper. Actually, it also contains gold and silver. These metals are recovered as a credit in the copper mining. Extending around the perimeter of the copper deposit, however, is a large halo of zinc, which is being mined rather extensively. Beyond the perimeter of the zinc orebody lies the richest manganese deposit in the United States. It has been estimated that approximately 93% of the manganese produced in the United States originates here. It occurs as a rose-colored formation and is easy to drill when compared to the blacker forms of manganese found in Arizona, South Africa and Russia.

Area Rich Underground

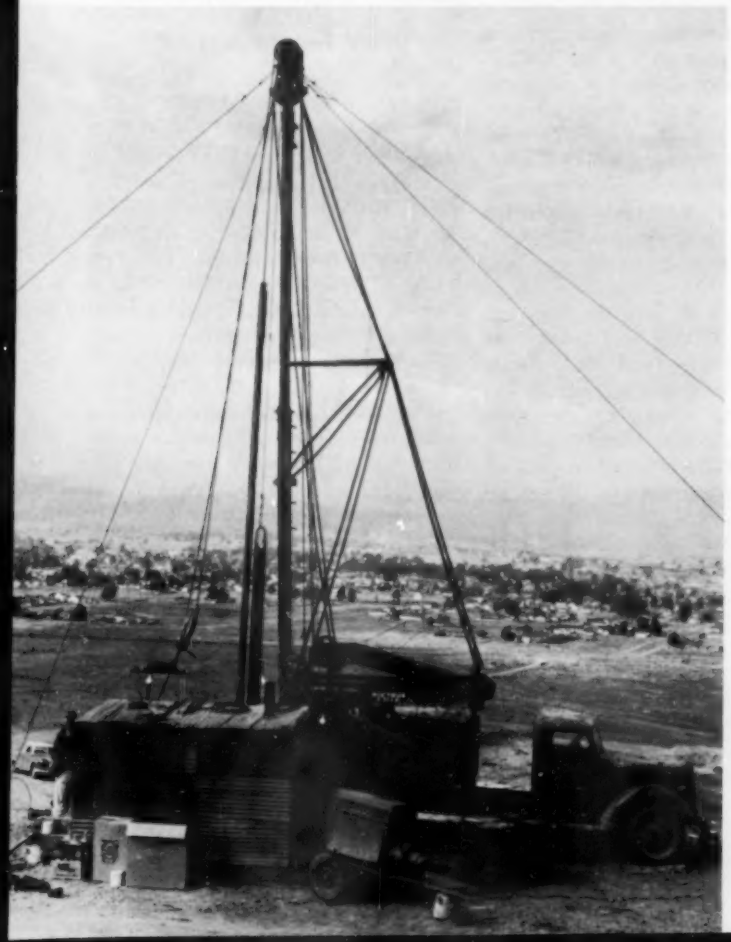
Butte truly is located over one of the richest underground areas in the world. When Lyon Drilling Co. completes its extensive exploration program, Anaconda's geologists will know for sure what lies underneath the property to a depth of approximately 1,000 feet.

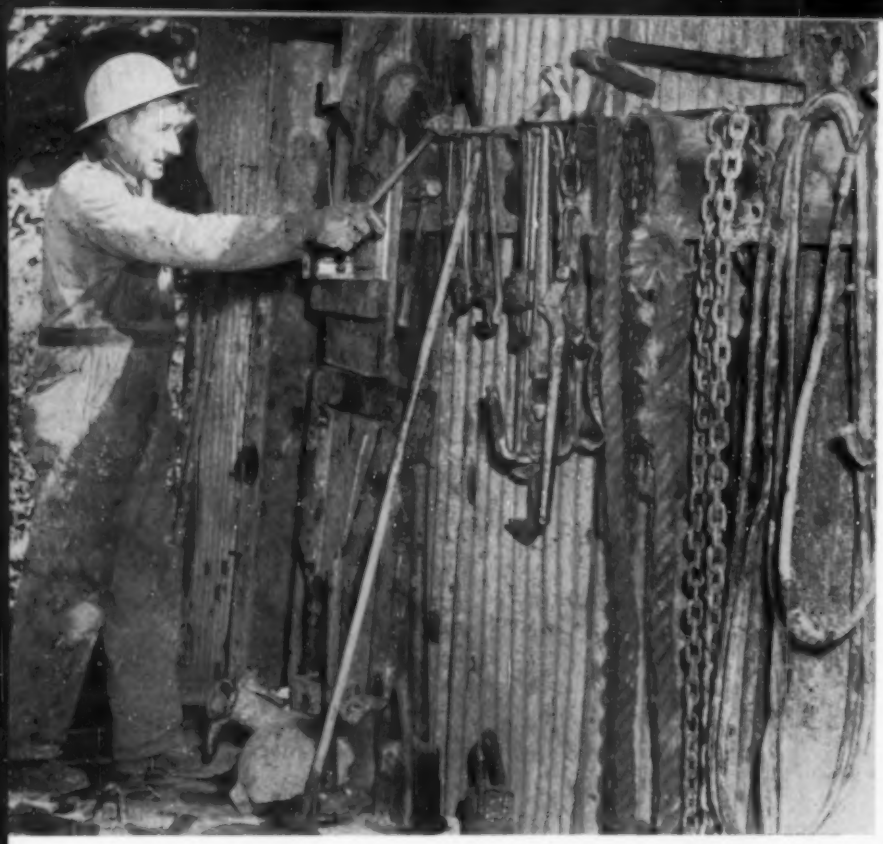
The Anaconda Co. settled on the churn-drill method of exploration after extensive study and consideration. Several factors influenced the decision. Because a well-drill hole can be cased, it was believed that accurate and relatively pure samples of the orebody could be obtained. The churn-drill method also offered the obvious advantage of giving larger physical samples of material. Well-drilling churn tools tend to seal the sides of a hole with drill mud. This feature, mine officials believed, would help seal off any caving particles which could alter a true sample.

In Anaconda's conception of the exploration program, one thing was certain. From past experience, it knew surely that the leached capping zone contained worthless material. Drilling specifications were definite, therefore, on one point: that steel casing should be installed to the bottom of the leached capping promptly on reaching the bottom of this zone. Although Anaconda's geologists knew that caving usually could be detected by particles much larger than those ground up under a drill bit, they took no chances on inaccurate or impure samples. Private capital was being invested in this case, and the answers developed by the drilling program had to be right. That is why they were so careful to specify adequate casing.

Lyon Drilling Co. has worked rapidly from the start of operations. When

Among the Lyon Drilling Co. churn drills on the Anaconda exploration project are a veteran 24-L (left) and a newer 60-L.





Driller Jerry Arner reaches for a wrench from a neat rack of drilling tools which is located alongside the 28-L. The Lyon Co. has drilled more than 200 holes on job.

the company received the notice to move in and start work, the job called for only the drilling which Anaconda regarded as initially necessary. That was on April 15, 1954, and it was believed at that time that six months of drilling would do the job.

The original job has been enlarged by repeat orders from Anaconda. At the time *Excavating Engineer* visited the job, Lyon had drilled 200 exploration holes totaling about 100,000 linear feet. The holes ranged in depth from 125 to 1,000 feet and were generally of 8, 10 and 13-in. diameter. The work was continuing as this was written.

Drilling Job Tough

It was not an easy drilling assignment. The leached-capping overburden is a much different formation and has a different density than the orebody underneath. To complicate matters further, part of the southern slope of the hill dips rather sharply downward. As any good churn-drill operator knows, that makes careful drilling necessary. In this case, crooked holes could not be tolerated because it was necessary to get casing in easily. The churn-drilling method has proved to be about the most economical method the company could have used in getting its exploration results.

When Lyon received the go-ahead, it moved in quickly with a fleet of Bucyrus-Erie churn drills. The first machines which came in included two 24-L's and a 29T. Upon completion of the first assignment, the 29-T was traded in on the purchase of a Bucyrus-Erie 28-L. The 28-L proved so suitable for deep-hole exploration drilling with heavy tools that a second one was purchased. In line with certain mining traditions, each of these machines has a name. The 28-L's are named *Miss Anaconda* and *Miss Amico*. *Miss Amico* derives her name from Anaconda, Miami, and Inspiration Copper Co., a joint-venture operation in Arizona. A 60-L recently purchased is named *Miss Miami*.

The exploration program is moving along conventional drilling lines. The exact location of holes is determined by Anaconda's geology department. Anaconda furnishes everything for the holes except the labor and drill rigs. Its dozers level off the sites where the holes are to be drilled. Because the underground area does not contain excessive ground water, whatever water needs to be brought in for drilling is transported by Anaconda pipelines laid from wells or nearby creeks. Anaconda also has supplied much of the steel casing used, although some of that responsibility also has been shared by the Lyon Drilling Co.

Gasoline, propane gas and diesel-power units are used on the various Bucyrus-Erie churn drills. Lyon recently purchased new a five-unit fleet of Lincoln welders, including four 200's and one 300.

Bits can be built up rapidly, sometimes while hanging on the tool string. Whether to dress a bit on the string is always determined by the time element. If it will take more than 45 minutes to finish the job, it is better to disconnect the tools, use another bit and work on the worn bit after the churn drill resumes its work. Stoody tube borium and Stoody self-hardening and manganese rods are being used for this build-up.

The churn drills all are working with heavy tool strings. The 28-L's for example, are handling a heavy Hubbard-type bit, drill stem, a rope socket, and drilling jars in any formations which tend to cave. Average weight of the tool string on the 28-L's is about 4,600 pounds. The 60-L is handling about 3,600 pounds, based on the same equipment. The 24-L is handling about 3,200 pounds.

Good Footages Recorded

This equipment has worked exceptionally well on deep-hole work in the 800, 900 and 1,000-ft. range. Tool strings and cable have handled well at that depth, and good footage has been made. Drilling operations are on a six-day week, 24-hour-a-day basis. All drillers work 12-hour shifts. One 28-L in a 24-hour period completed 250 linear feet. In good drilling, the machines frequently do from 50 to 100 feet per day. Even in tricky formations, they get 35 to 40 feet.

One of the precautionary measures which is always the rule is the full clean-out of a drill hole every five feet. This also reduces any possible error in the sampling of material for a 5-ft. distance. There is a sampler on duty at each rig during its working hours to record an accurate log and do other routine work incidental to exploration drilling. One of the things these men do, for example, is a paste-up on graph paper of grains taken from the samples. The display is arranged according to depth location where the material was found.

The Anaconda drilling assignment

Lyon Drilling Company's far-flung operations are supervised from her office in California by Mrs. Leona Lyon. Picture on desk is of her husband, the late Aubrey Lyon.

carries on the Lyon drilling name under heroic circumstances. The company was founded by Mr. and Mrs. Aubrey Lyon back in the 1920's as Aubrey Lyon, Well Contractor. It was successful from the start, even during the lean years of the depression. After bringing the firm to full stature as a well-drilling contracting organization, with offices in Los Angeles and Phoenix, Aubrey Lyon was seriously injured in an automobile accident. He lay for 4½ years in a coma. Mrs. Lyon continued the drilling business during this period. The business, however, was always secondary in importance to her interest in the welfare of her husband. After Aubrey Lyon's death two years ago, Mrs. Lyon determined to carry on the business on the same honest, reputable basis her husband had set up many years ago.

No machine on the Lyon string at Butte is being babied. The drills average 140 hours of drilling time per week. The equipment is holding up dependably in spite of these long hours.

When F & S Contracting Co. of Butte landed its initial excavation assignment, it bit off a real rock job for itself. In the first increment are 2,100,000 cubic yards of waste overburden excavation and the digging of about 400,000 yards of copper ore.

One of the complicating conditions of the excavation assignment is a general lack of working room. Later, if open-cut methods are extended, that problem should disappear. It's a real headache now. Buildings on the surface stand in the way. At one of the three principal open-cut locations, a railroad embankment had to be left in during the initial opening-up stages until it could be rebuilt at a lower level. There also is some congestion on the haul roads because maintaining mine-equipment traffic is a necessity.

Modernized Drilling

After an initial period of trial and error, F & S Contracting Co. turned to a modern blast-hole drilling program. The program consists of large-diameter (9-in.) powder holes on 21-ft. centers drilled by the latest type of rotary drilling equipment. The program is rounded out with the use of the latest ammonium-nitrate high explosives developed by The Maumee Collieries, Terre Haute, Ind.

Drilling operations started with a special tractor-mounted rig carrying a 600-cfm compressor which powered a drill. Although this machine has performed very well in highway construction in Montana, it could not keep up to the loading capacity of new power-shovel loading equipment which F & S had purchased.

The company then decided to purchase a Bucyrus-Erie 40-R rotary blast-hole drill. Powered by electricity and using Gardner-Denver compressor equipment, this machine was crawler mounted and had hydraulic leveling-control mechanism. By working out a 4-ft. extension to its normal 28-ft. rotary drill pipe, F & S men were able to equip the 40-R to drill uniform 32-ft. depth holes without a change of steel.

A Hughes Tri-Cone-type of rotary oilfield bit is being used on the 40-R. Like its bigger brother, the 50-R, the 40-R has variable rotation speed and varying degrees of down pressure which a drill operator can apply on the bit. Drill dust is no nuisance, since a water jet is available for dampening this material lightly in the hole. The coned-up mound of drill cuttings left over after a hole is completed serves as excellent material for stemming over the powder charge.

According to key job officials of F & S Contracting Co., the 40-R with the Hughes bit combination has given an excellent account of itself. In overburden rock, which is a granitic-type formation, the machine drilled a 32-ft. hole in 12 minutes when the drill bit was

Among Anaconda Copper's experienced veterans is E. P. Shea, chief geologist.

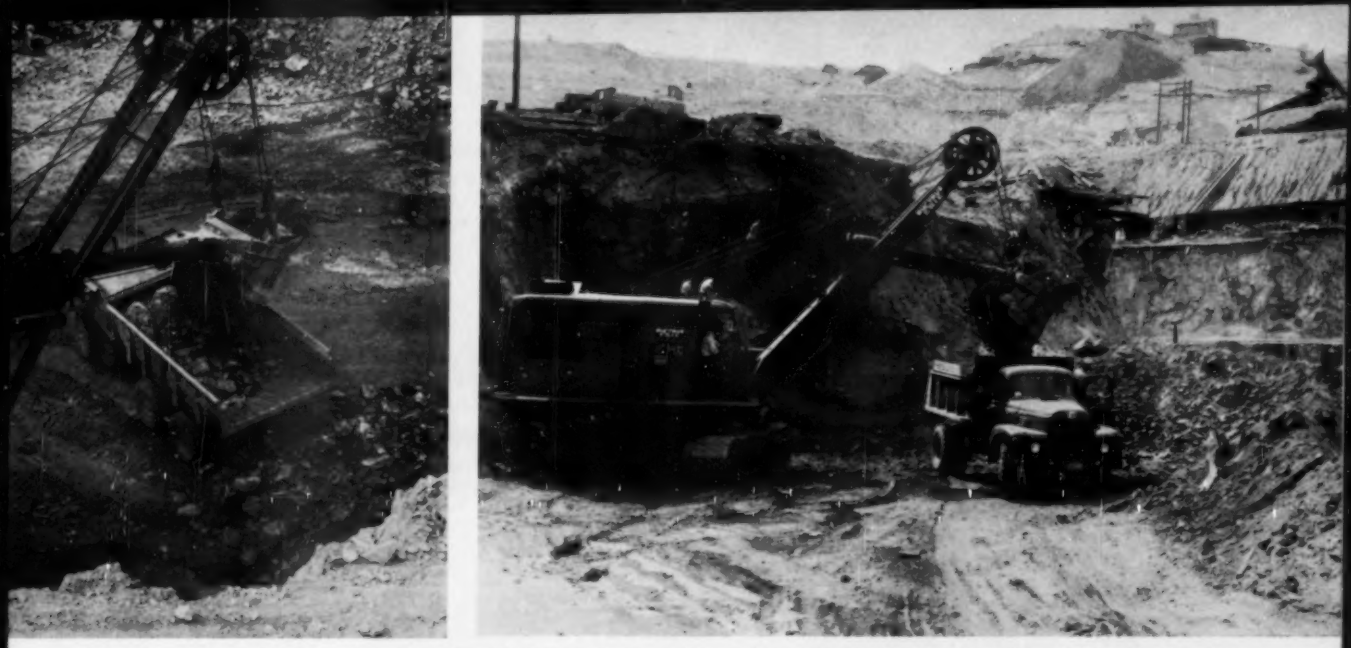
(Above) A Bucyrus-Erie 40-R rotary blast hole drill is employed on Anaconda job by the F & S Co. (Below) A 9-in. hole drilled by the 40-R is loaded by two powdermen.

new. Nine-inch drill bits, have given an outstanding performance, showing average life of about 5,000 feet. Bit life has varied between 4,400 and 6,600 feet, with about 5,000 feet being a fair average.

The 40-R has worked so rapidly, according to F & S officials, that it has been able to stay ahead of a 6-yd. shovel, even when the drill works less than a full shift each day.

After a row of holes has been drilled out to a point seven feet below floor grade by the 40-R, powdermen quickly load each hole. DuPont, Atlas and Hercules powders have been used, mostly of the ammonium nitrate type.

When *Excavating Engineer* visited the mine, DuPont's Akremite was being used in 50-lb. bags. Akremite is relatively insensitive. The holes are loaded to approximately 18 feet of ground sur-



Two of the Bucyrus-Erie shovels employed on the Anaconda excavation assignment are a new 6-yd. machine (left) and a 2-yarder.

face, after which drill cuttings are shoveled in for stemming. Each hole is equipped with a 25-lb. stick of Atlas RXL-190 gelatin-type powder, which, in turn, is fitted with an Atlas electric blasting cap.

Anaconda has always been considerate of its neighbors, so one of its blasting policies is that only one hole can be exploded at a time. F & S Contracting Co. is cooperating by equipping a line of holes with Atlas Rockmaster delay caps. No more than seven holes are ever exploded in a series, so Atlas Rockmaster delays through No. 7 are used. This creates a long, single-hole shot which hardly shakes the adjoining ground. The powdermen regularly pull large shots within 30 feet of new shovel equipment without any damage.

The daily job of loading large quantities of broken overburden rock and copper ore is one for high-capacity rock equipment. F & S staffed up with the best units of an equipment fleet it owned previously and purchased new equipment.

Power Shovel Lineup

In the F & S lineup now are a new Bucyrus-Erie 6-yd. 150-B power shovel; three Bucyrus-Erie 54-B's, two of them equipped with 3-yd. Esco dippers and one a 2½-yd. Bucyrus-Erie dipper; two 2-yd. Bucyrus-Erie 51-B's; and a ¾-yd. Bucyrus-Erie 22-B shovel. When we visited the project, the 150-B and a new 54-B were working one site, the 22-B was finishing out some work at another point and the remaining 54 and 51-B's were working a third open-cut site.

The company also has adequate hauling equipment. These units include nine FFD Euclids with torque converters and twin drives, rated at about 20 cubic yards water level capacity. There are also six 36-TD Euclids, rated at 16.7 cubic yards, and seven 27-FD Euclids, rated at 9.7 cubic yards water level. F & S rounds out its fleet from time to time with a few rented trucks.

The company uses four new Caterpillar Series E D8's at various points on the job, chiefly for cleaning up the pit floor around shovels. A new Caterpillar D9 has been brought in for use in haul road construction. An Allis-Chalmers HD-21 is being used at the top of an enormous spoil pile created by the Euclid dumps. A pair of Caterpillar motor graders also help in keeping haul

Continued on page 67

(Left) Some drilling is done by this Joy drill mounted with an I-R compressor on Cat D8. (Right) A D9 works on haul road.

A dragline positioned on a barge and a dragshovel team up for work on the St. Louis crossing of South Saskatchewan River.

Saskatchewan Gets 226 Miles of Gas Line

MANY years have passed since the city of Prince Albert, in north central Saskatchewan, Canada, was principally noted as a jump-off place for fur traders, trappers and hunters. Prince Albert is situated on the northern edge of the great Canadian wheat plains. It lies just south of the expansive wilderness areas. Much of the northwest history is written around the pioneers who settled in Prince Albert.

Today Prince Albert is a thriving community with a population of about 17,000. Last October the townspeople were looking with civic pride to the opening of a municipal natural gas supply system. A new 226-mile line was being laid to Prince Albert from the gas fields near Coleville, in southwest Saskatchewan. Completion of the city distribution system also was anticipated.

A young, fast-growing and fast-moving construction company, Majestic Contractors Ltd., Edmonton, Alberta, had the pipe-laying contract.

Firm Formed In 1954

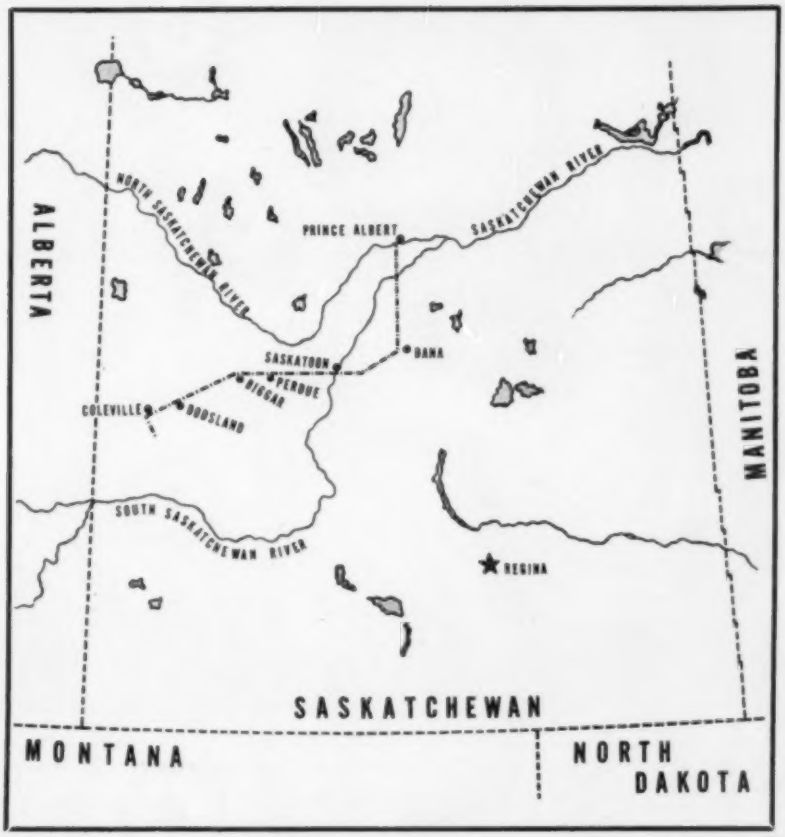
The firm was formed in November 1954 under Dick Jernigan, who now is Majestic's president, and Bill Aldridge, vice president. Both of these men had considerable experience in the pipeline business. Both of them saw a future in Canada in pipeline contracting.

They knew how to do the job. They knew what equipment was best suited for a particular situation. They knew where to obtain the equipment and how to train the men. They also knew that it takes experienced men to take charge in the field.

They gathered equipment, most of it new, because they knew that a pipeline outfit must move fast, unhindered by breakdowns or slow moving equipment. They obtained experienced men from Texas, Arkansas and Canada, among other places.

The line they were laying for Saskatchewan Power Corp. was a typical operation which included several big river crossings. The over-all contract

Short summers and cold winters in western Canada make the laying of pipelines a rugged business. Majestic Contractors Ltd. builds a reputation for doing job in any kind of weather.



(Above) Map of portion of Saskatchewan shows work area. (Below) The river ditch is prepared by a Swing-Tex suction dredge, trucked to the job site from Kansas City.

called for a line 226 miles long from the Coleville gas fields to Prince Albert. For about 70 miles of the line, from Prince Albert to Dana, 10-in. pipe was scheduled. From Dana to Saskatoon, a distance of about 40 miles, 12-in. pipe was installed. For the remaining distance, from Saskatoon to Coleville, the pipe diameter was 14 inches.

While the regular crews were moving rapidly toward Coleville, the river crossing crew was completing operations at the St. Louis crossing of the North Saskatchewan River near Prince Albert. The crossing job began early in August and was completed in about six weeks. When *Excavating Engineer* visited the job in mid-September, final backfilling was in process. Preparations were being made for the move to the city of Saskatoon and the second major river crossing on the South Saskatchewan River.

P. A. Gary, a big and weather-cuffed Texan with plenty of pipeline experience, was in charge of the crossing crew. Though of southern background, the drawling Texan didn't seem to mind the bitter cold wind that swept the north-

(Above) A two-man crew buffs the pipe. The hand-held buffer is powered by an Onan portable generator. (Below) One 22-B clamshell moves up while another is digging.

ern prairies so early in the season. Gary had worked pipelines in the north country for several years and was thoroughly familiar with most of the winter problems.

Deep snow and sub-zero temperatures are not uncommon in the north country in early October. Temperatures in mid-winter range from 20 to 50 degrees below zero.

During the winter of 1953, the temperature one day dipped to 17 below at Edmonton, Alberta, but workmen continued to hook up new tanks and lay pipe. It was necessary, of course, to preheat the pipe with a kerosene blower. When the pipe was warmed sufficiently to melt the snow, the welders went to work. Heaters were used on the carburetors of the welding machines.

Dragshovel Trenches

Whenever possible, wind breakers were used. A K&W ripper was used to break the crust of the frozen ground. A dragshovel did the trenching. One of the major problems was making it possible for men to work in sub-zero temperatures. Every possible protection was provided, however, and the job continued through the long winter.

But winter, although it was near at hand, was only something to talk about on the St. Louis crossing job.

The over-all crossing distance on the North Saskatchewan River was 942 feet. Deep trenches were excavated from the water's edge to the plains. The south bank was ditched to a depth of 30 feet; the north bank required a 28-ft. deep ditch. A minimum cover of eight feet was required in the stream bed. This called for digging to 15 feet beneath the water's surface.

A Swing-Tex suction dredge was trucked from Kansas City, Mo., to prepare the river ditch. A caravan of seven trucks made the haul in one trip. Power on the dredge was supplied by a Caterpillar D13000 engine and three International power units.

Large Boulders Found

Unusual digging was encountered in the river, Gary said. A type of chalk, which hardened when it was wet and powdered when it was dry, gave the crew some trouble. Large boulders were also discovered in the path of the trench. Two Bucyrus-Erie 22-B's, one a dragshovel and the other a clamshell, were placed on a barge to do the boulder digging that the dredge couldn't handle.

Before the 12-in. pipe was laid, it got

(Above) Model 320 Cleveland trenchers such as this one did the bulk of the ditching. (Below) Dragshovel works on road crossing.

the special river crossing treatment by sections. Every weld was examined before a double coating of Husky dope was applied. Two wraps of fiberglass paper covered the dope. One wrap of 15-lb. felt paper and one of rock shield completed the protective layers.

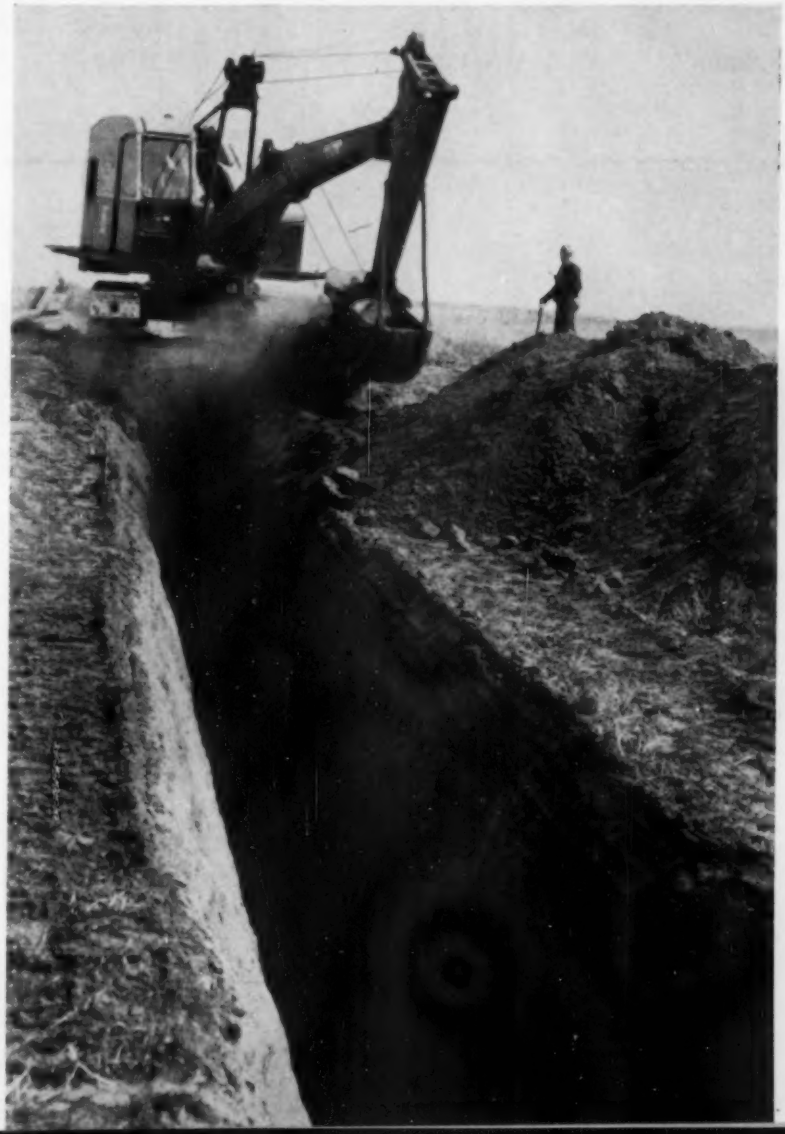
A solid layer of ½-in. wood lath was tied around the wrapping to protect it from rock scrapes during dragging-in operations. River clamps, 800 pounds each, were spaced at 35-ft. intervals. The pipe preparations were completed with a 1,500-lb. water test.

The sections were carried into position by two Caterpillar D7 tractors and were pulled through by a D7 dozer on the far bank. The traveling end of the pipe was closed, but the pipe end was kept out of water. Actual laying-in operations were completed in eight hours.

Working conditions along the rest of the line were almost ideal, said R. L. Leonard, the spread superintendent. Operations proceeded smoothly at a steady pace of about 18,000 lineal feet per day. The terrain was rolling and open. Weather provided little or no trouble.

The right-of-way crew kicked off on May 24th and the pipe gang started June 16, to assure a fairly long summer working season. The first camp was set up near Saskatoon. Later, the camp was moved to Biggar, 65 miles west of Saskatoon. The mobility of the outfit became apparent in this move.

The camp, consisting of a number of family trailers, two office trailers, two



(Above) A Cat 583 pipelayer swings a Cessco cleaning and priming machine. (Below) Another pipelayer holds a Cessco coating and wrapping unit as it starts section.

parts trailers, five parts houses, radio antennas and other equipment, was moved in one day. The new camp was set up without interrupting the regular ditching and pipe laying operations.

In charge of the move was Master Mechanic Matt Rachal, who said that he had never seen a smoother operation in his many years in pipeline work. In keeping with a company policy of good public relations the old camp site was cleared and tidied up on the day of the move.

The same policy of public relations is followed before the camp is moved into another city or village. The modern company-owned ambulance is put at the disposal of the town. The company airplane, a 170 Cessna, is also made available for town emergencies.

For the protection of the Majestic employees and townspeople alike, an advertisement announcing the arrival of the camp is placed in the town paper. The ad asks merchants not to raise their prices or otherwise take unfair advantage of the influx of new business. Merchants are advised that should they not comply with the request, the company will supply the camp in every detail and there will be no new business. The ads lead to harmony between townspeople and the pipeline men.

6-ft. Frost Line

Ditching for the pipeline went to a depth of six feet because of the low frost line. The frost line reaches a depth of almost six feet.

Two Model 320 Cleveland trenchers did the bulk of the ditching. No drilling or blasting were required.

Some sections were underlaid with boulders of all sizes. These sections, and also road and railway approaches, were

(Below) Coating and wrapping of a section is in full swing. A Cessco dope pot is at the right. A workman examines welds.

(Left) Here is the tie-in for Prince Albert. (Right) The community of 17,000 joyously announced the coming of natural gas.

handled by four Bucyrus-Erie 22-B dragshovels and two 22-B cranes equipped with Owen clamshell buckets. A Cat D7 dozer assisted at road crossings. All road and railroad crossings were bored and cased in one operation with a Crose boring machine.

To insure a smooth-running operation, the ditching and welding crews worked well ahead of the lowering-in and backfilling gangs. From two to three miles often separated the front and back gangs. Stringing, subbed out to Canadian Parkhill, held a similar distance at all times.

The bending crew led the way with a Caterpillar sideboom, equipped with a bending shoe, and a Cat D6. After the pipe was positioned, a two-man buffing crew with a 115-volt hand-held buffer appeared. Power for the buffer was supplied by an Onan 15-DL-13 portable generator. The buffing crew was followed closely by the rest of the pipe gang with a D7 sideboom and two Lincoln 300-amp. welders mounted on an Athey wagon and pulled by a D6 tow-cat.

The hot pass welding crew used three 300-amp. Lincoln welding machines which were mounted on an Athey wagon pulled by a Cat D6. The back gang used 10 Lincoln 200-amp. welders mounted on rubber-tired farm wagons which were pulled by a Cat D4 and a Ford farm tractor. Fleetweld rod was used by the hot pass and stringer bead crews. The back gang used Shield Arc No. 85 rod.

In between the welding and backfilling crews was a fast-moving dope gang. One of two Caterpillar 583 pipelayers swung a Cessco cleaning and priming machine; the other held a Cessco coating and wrapping unit. Also used by the dope gang was a D7 sideboom, a D7 tow tractor and four Cessco dope pots.

Backfilling, which followed immediately behind the lowering-in gang, was accomplished by a Cat D318-powered Cleveland 190 backfiller. Tie-ins were made by using two D7 sidebooms, a D7 dozer pulling an Athey-supported welding unit and a Bucyrus-Erie 22-B with an Owen clamshell bucket. On the clean-up end, several D7 dozers, a Cat 112 motor grader and a Ferguson disc towed by a Ford rubber-tired tractor were used. Fences were replaced, the ground was leveled and the right-of-way was groomed to its original condition.

Compared to the noise, hustle and dust along the line, the camp at Big-

Continued on page 68

A Rex pump dewaters a section of ditch. The lines to Prince Albert, consisting of 10, 12 and 14-in. pipe, extend from Coleville in the southwestern part of Saskatchewan.

Approximately 3,500 feet of the excavation of the Arcadia Wash channel were handled by Caterpillar scrapers and bulldozers.

Los Angeles Builds Flood Guards

by J. E. DeMuth

VISITORS to Los Angeles (Calif.) County often joke about its "dry" rivers. Year-around residents don't think it's humorous, though, when waters from the mountains inundate the plains areas of the west coast metropolis.

Something is being done, however, to control the floods. The something is the comprehensive Los Angeles County Drainage Area Plan, for which construction and monetary authorizations were provided under flood control acts approved by Congress. The project, when completed, will give flood protection to the 508-square mile area in the county.

The plan provides for the construction of five flood-control basins, 33 debris basins, 104.6 miles of main channels, 181.5 miles of tributary channels, two jetties and 328 bridges.

Total cost of the project, including the Whittier Narrows Dam, has been estimated at $380 million.

Construction is under the direction of the United States Army Corps of Engineers, Los Angeles District. Col. Arthur H. Frye, Jr., is district engineer. The entire plan was developed in cooperation with the Los Angeles County Flood Control District which, through its chief engineer, is responsible directly to the county board of supervisors.

Los Angeles County is responsible for obtaining rights-of-way for many of the channels, for highway and highway bridge modifications, for the development of many tributary channels and debris basins and for the installation of storm drains. The county flood district is responsible for operating and maintaining the tributary and main stem channels where it obtains the rights-of-way.

Relocation costs will exceed $20 million, including: relocation of roads,

Corps of Engineers and Los Angeles County Flood Control District work together on the construction of $380 million control system. MacDonald and Kruse, Inc., construct channel.

$2,348,000; relocation of railroads and railroad bridges, $10,012,900; relocation of utilities, $8,325,600.

The five dams, located on the Los Angeles and San Gabriel river systems, are primarily flood control dams, with provisions for water conservation by local interests. All the dams are completed or are in the final stages of construction. The Los Angeles River has been improved along its entire length, save for an area in Compton and North Long Beach, Calif., which is being improved as funds become available.

Channel developments consist principally of enlarging, straightening, lining or paving to provide the necessary capacities to carry floodwaters.

Flow of 150,000 cfs

The project is designed for a maximum flow of 150,000 cfs at the mouth of the Los Angeles River. The flow varies inversely as the channel progresses upstream.

The lower reaches of the channels normally are improved first. Work then proceeds upstream toward the tributaries. Finally, when the channels are completed, debris basins at the mouths of the canyons are constructed.

Emergency conditions cause some variation in the schedule. To provide immediate local protection, a few debris basins were built prior to downstream channel improvements.

MacDonald and Kruse, Inc., Sun Valley, Calif., is one of several contracting firms which have had major contracts in the flood control program. The firm's first job under the program was on the Dominguez channel. It was completed

(Above) A Northwest Model 6 dragline (front) and a Bucyrus-Erie 54-B dragline (background) excavate the center section. (Below) The crane charges batch plant.

A 3½-yd. dragline deposits a load into one of the Ford 12-yd. dumps on job.

(Left) Transit Crane lowers finisher into trench. (Right) Concrete is poured from trucks into hopper mounted on the bridge.

in 1950. It also completed the Aliso Wash contract at Reseda, Calif., and the Los Angeles River job from Reseda to the Sepulveda Reservoir.

When this was written, MacDonald and Kruse was working on the Arcadia Wash channel project, which begins at the famous Santa Anita race track and runs south to the Rio Hondo River and from there into the Los Angeles River.

The contract covers 2.79 miles of 32 ft. wide invert with 12 ft. walls. Channel excavation involves 490,000 cubic yards, most of it sandy loam. Contract concrete totals are 20,400 cubic yards in the invert and 12,500 cubic yards in the walls. The channel is crossed by 18 highway bridges, which require 2,000 cubic yards of structural excavation and 5,460 cubic yards of concrete. The bridges were constructed alternately along the channel, facilitating traffic flow on the cross streets.

The job also calls for 3,366,000 pounds of reinforcing steel. The channel is completely enclosed by continuous chain link fence on top of the walls and across the bridges. The contract bid for this job was $1,508,228.

MacDonald and Kruse handled the upper section excavation with three International TD-24 tractors and B-250 scrapers. The center, and largest section, was excavated by a Bucyrus-Erie 54-B dragline with a 3½-yd. Hendrix bucket and a Northwest model 6 dragline. Both draglines loaded into a fleet of 35 trucks, which hauled 4½ miles to a road job. Most of the trucks were Ford 12-yd. semi-trailer dumps. Also included were International, General Motors and Mack trucks.

Excavation of the lower section was subcontracted to Lowe and Watson Co. and Robert L. Parker Co., joint venturers. They handled the job with Caterpillar Model 20 and 21 scrapers and D8 bulldozers.

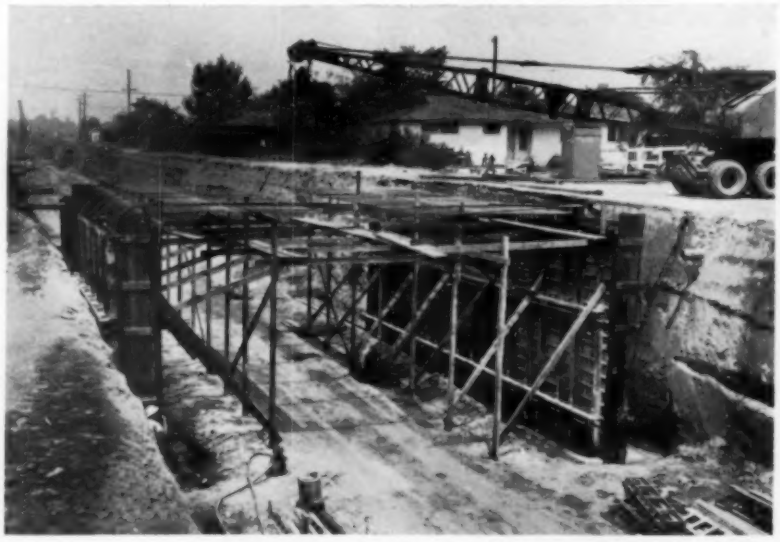
Material Stockpiled

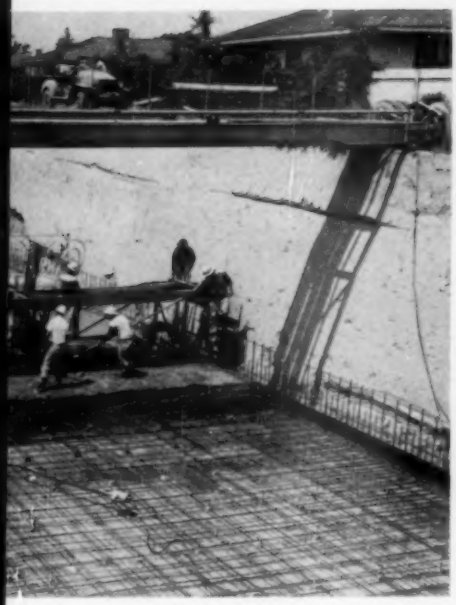
Taken from the excavations and stockpiled for later backfilling of walls and bridges was 130,000 cubic yards of select material. All of the backfill will be compacted to Corps of Engineers' specifications. The fine grade for the invert was done with a Bros Wobble wheel and a Buffalo-Springfield three-wheel, 10-ton roller.

A Bucyrus-Erie 22-B Transit Crane, a Northwest Model 25 truck crane and a Model 304 Koehring crawler crane did crane work and miscellaneous excavation. After handling some of the excavation, the Model 6 Northwest was transferred to charging bins at the batch plant.

All concrete for the project is processed through a company-designed and

A Transit Crane's boom protrudes over abutment for one of the 18 similar highway bridges crossing the 2.79 miles of channel constructed by MacDonald & Kruse.





(Right) View looking south shows the invert as poured and the wall forms ready for use. U. S. Engineers direct the project.

fully automatic batch plant. The concrete is hauled to the job in transit mix trucks of 4½ to 6½-yd. capacity. Up to 637 cubic yards were poured in a single shift. The aggregate is obtained from Los Angeles suppliers.

The concrete is poured from a traveling concrete bucket installed on a self-propelled bridge and finished with a traveling finishing machine.

Where possible, concrete for walls and bridge abutments was spouted directly from transit mix trucks. Pours in less accessible places were handled

Continued on page 68

(Above) The firm's field office. (Below) Harvey Kruse and Gordon MacDonald.

Workmen set forms for pouring the decks on one of the bridges. The bridges required 5,460 cubic yards of concrete.

How to

CUT CLEARING COSTS

To help you clear land faster and cheaper, here are NEW IDEAS developed by clearing specialist Wade Lahar Construction Co. These "tricks" will help Lahar and their 22 International tractors finish a 23,500-acre job at Buford Dam 7 months ahead of an 18-month schedule.

One pass levels 18-inch trees—Where clearing to ground level is your primary job, Contractor Lahar recommends a big International tractor and V-shaped cutter. The cutter shown was designed and built by Herman Hackler, project manager, at Lahar's home plant in Mountain Home, Arkansas. Four 200 hp International TD-24's, so equipped, are handling most of the Buford Dam reservoir clearing near Atlanta, Georgia. In typical operation, they cut over so much land that 18 other International tractors are

1-to-5 slopes, 1,300 acres per month—Your TD-24 will efficiently clear trees from steep grades as well as from level ground. Here's what Herman Hackler, project manager for Lahar on the $1,611,560 contract, says about this big 200 hp, 8 mph crawler: "TD-24's high-low steering range keeps cutter against the tree until it falls, even on steepest slopes. This factor, plus the "24's" great power, excellent traction, and over-all balance, is letting us crawler-cut 99% of our Buford Dam job, despite slopes averaging 1-to-5, and, in some places, 1-to-4. Our fleet of *22 International tractors*—11 TD-24's (four of them with cutters), six TD-18's, three TD-14's, and two TD-9's—clears and rakes 1,300 acres per month. This production, in our opinion, could not be exceeded by any other make of tractor!"

Burn, turn with one tractor—On big jobs, Mr. Lahar suggests use of one medium-sized tractor to handle burning of brush piles. This leaves bigger machines free for production work. Note how clear the raked ground is behind tractor. When Lahar's job is done, some 14,000 acres will be completely cleared; about 9,400 acres partly cleared, with some trees left standing in the water to benefit future water life.

Team decking boosts output—Where terrain permits, three to six of Lahar's 22 IH crawlers team to rake and pile the cut brush and trees. This gives two advantages . . . (1) rakes, by catching both ends of fallen trees and brush, pick up material lying between tractors which normally would require separate pass . . . (2) one pass per team is all that's needed to provide a clean swath.

kept busy decking and burning. One pass of their 13-ft long, 14-ft wide blade slices saw-like through brush, pine, and mixed hardwoods up to 18 inches in diameter. For scattered trees up to 12 inches in diameter, a similar though smaller cutter is used on a 66 dhp International TD-14A. Both TD-24 and TD-14 have a canopy of 2 and 2½-inch pipe. This protects operator and machine. Entire canopy and cutter assembly pins to regular A-frame . . . can be quickly detached and interchanged with standard or other special blades.

Blade "saws" larger trees—If your clearing work involves trees larger than 18 inches, here's another idea from Wade Lahar Construction Co. Using same mild-steel cutter blade as on smaller trees, have TD-24 operator "see-saw" back and forth a few times to cut the trunk. Just a few seconds' work with the 64,000-lb TD-24 will topple the tree.

Careful in-the-field maintenance boosts output, too. Left, mechanic uses compressed air to blow dirt and leaves from TD-24 radiator core. Right, special steel tooth, 2½ ft long with 18-inch overhang, is welded to TD-24 blade. Four teeth and top blade extension are used per raking tractor.

Winches logs from swamp—Clearing from marshy areas may present you with quite a problem too. Wade Lahar Construction Co does this work, 1% of their 23,500-acre Corps of Engineer job, with chain saw crews and winch-equipped TD-9 and TD-18 crawlers. After winching in, tractors skid timber to central area.

International

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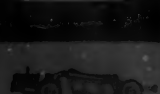
A machine size for every job . . . see your nearest INTERNATIONAL INDUSTRIAL POWER DISTRIBUTOR for details.



PAYSCRAPERS
13 yds. and 18½ yds.

CRAWLER TRACTORS
8 Models . . 40 to 200 hp

DIESEL, GAS ENGINES
18 Models . 16½ to 200 hp

WHEEL TRACTORS
8 Models . . . 9 to 59 dhp

ALSO: International Draft Loaders . . . International Scrapers, Bottom-Dump Wagons . . . International Superior Pipe-Boom Tractors . . . and International Trucks.

News from the Field

Drill Cuts Highway Cost

"The most expensive kind of excavation is a drilled hole in concrete," is a popular construction saying, but it isn't necessarily so. MacIntosh Asphalt Paving Co. of Pittsburgh, Pa., says it isn't.

Working on the Pennsylvania Turnpike in 1955, the company disregarded conventional drilling methods on asphalt underseal work and boosted production of drilled holes by 45%. The remarkable improvement in performance was made possible by using a Le Roi Tractair 125 self-propelled air compressor carrying a Cleveland wagon drill in a hydraulic mounting. Cost cutting and the increase in overall production was achieved by removing unnecessary man hours of labor from the pavement drilling operation.

Instead of many drillers and hose-dragger helpers, along with the truck driver who formerly had to tow the compressor, the whole operation now consists of a driller and flagman.

Results are dramatic. The Tractair operator in an hour can drive from 94 to 100 holes 1¼ inches in diameter through the thick, rock-hard Turnpike concrete. Spacings range from 2 to 10 feet, averaging 6 feet. The single rig has boosted the undersealing capacity of the remainder of the crew by being able to cover about a mile a day. In actual practice, the machine is able to stay ahead of the undersealing crew by working only half a shift each day.

The new application replaces the traditional older method of hand-held pneumatic drillers and of using one or more compressors under traffic conditions. It does away with the use of rubber hose with its attendant handling costs under these conditions. The presence of only one machine, instead of several, on the highway has reduced congestion and interference with traffic. The flagman's job is easier and motorists are safer.

Focal point of the installation is the Tractair compressor, with the Cleveland drill set vertically at right angles to the pavement. A simple swing connection in the mounting makes it easy to center the drill point swiftly over location marks set by surveyors. It is necessary only for the operator to set the machine reasonably close to the location point, making the remaining adjustment with the swing feature.

Working rapidly, this Le Roi Tractair traveling compressor and its drill mounting move down the Pennsylvania Turnpike drilling asphalt underseal holes in pavement.

Timken rock bits are being used on the drill for sinking the 1¼-in. diameter holes. These bits last through 50 or 60 holes before being discarded. The drill mounting has hydraulic down pressure available so that bits can be pushed rapidly through the concrete, whose strength now is well over 5,000 psi under compressive tests.

According to an operator, the compressor on the machine also is able to handle about 100% more load than the Cleveland drill represents. This permits the machine to power air tools and do other small jobs around the project.

According to field officials of the MacIntosh Co., the profitable equipment application also has enhanced the performance of the asphalt crew. This crew follows along behind with truck-mounted tanks of hot asphalt and pumps that material under the slab at high pressure. The purpose of the asphalt is to replace mud, water and voids,

Continued on page 42

Frank Dow Merrill

Frank Dow Merrill, 52, leader of the celebrated "Merrill's Marauders" infantry group which won fame in Burma jungle warfare in World War II, died late in December. The retired major general, United States Army, suffered a fatal heart attack at Jacksonville, Fla., while returning to New Hampshire from a convention of the American Association of Highway Officials at New Orleans, La. Gen. Merrill had been elected president of the Association.

A West Point graduate, Gen. Merrill served as an Army engineer prior to the war. He later became noted as an infantry combat leader because of his mastery of jungle guerilla tactics. His active military career ended in 1948 when he suffered a heart attack.

He was appointed New Hampshire highway commissioner in 1948 by former Gov. Sherman Adams. He was credited with an important role in obtaining approval of a 15-year state highway building program, the largest ever authorized in New Hampshire.

CATERPILLAR ANNOUNCES:

A NEW TRACTOR-MOUNTED RIPPER!

...TO SPEED UP SCRAPER LOADING
...KEEP EARTHMOVING COSTS DOWN

WHY TRACTOR-MOUNTED. With the tractor-mounted CAT® No. 8 Ripper, full weight of rear of tractor provides down pressure. No weights or ballast needed. With ripper beam raised, tractor is fully maneuverable. At end of ripping job, unit is fully available for bulldozing—with ripper instantly ready when needed again. When ripper teeth are swung up, drawbar is available for use.

WHY "LIVE DRIVE." Pump providing hydraulic power for ripper is driven directly from engine rear power take-off. This means ripper can be raised or lowered whenever engine is running, independent of tractor motion or flywheel clutch. Raise, hold, lower and float positions controlled by touch of operator on conveniently located lever. Hydraulic cylinders have enough force to lift rear of tractor off ground.

FEATURES

- **Strong, curved shanks of hardened alloy steel.**
- **Hardened steel points, quickly replaceable.**
- **Whole assembly mounted on heavy box-section beam.**
- **10-degree pivot of shanks to either side allows easy tractor steering.**
- **Individual shanks can be pinned up out of way, for single tooth ripping.**
- **Finger-tip operation of controls, easy handling.**
- **Total weight, hydraulic control and ripper: 6680 lb.**

Your Caterpillar Dealer can show you how this new ripper can increase production and profit for you by cutting scraper loading time. When you standardize on Cat-built equipment, you standardize on competent dealer service and Caterpillar parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

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NEW HEAVY-DUTY TRACTOR-MOUNTED RIPPERS

CATERPILLAR TRACTOR CO., Peoria, Illinois, U. S. A.

Please send me full information about the No. 8 Ripper.

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How to set down only ONE POUND of a 9-ton load!

Hydrocrane Does It with Precision Hydraulic Control

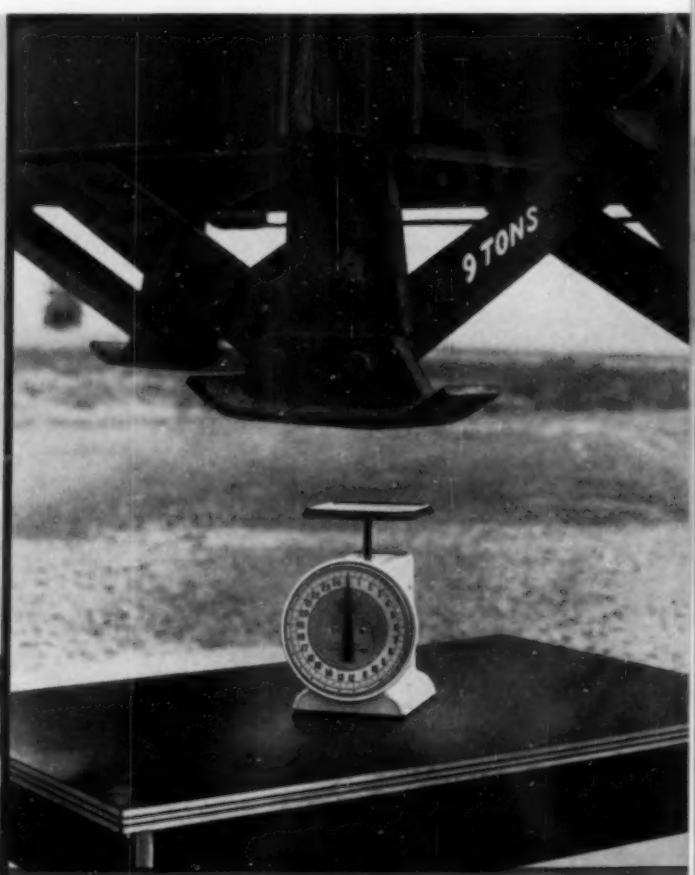
Take a good look at this remarkable demonstration of Hydrocrane control, then picture a Hydrocrane at work for you. For setting beams or concrete slabs, pouring cement or setting a plate glass window — *any* job that requires hairline control — nothing can beat the Hydrocrane in saving you time and money.

The all-hydraulic Hydrocrane is an expert at working in close quarters, too. It has the shortest tail swing, size for size, of any revolving crane, and its unique telescoping boom can reach out and poke a load into hard-to-get-at places.

Contractors who own Hydrocranes call them, "the handiest machines we have." You'll say so too when you get all the facts from your Bucyrus-Erie distributor. *Do it soon.*

107H55C

1. Hydrocrane's control is so fine that load movement can be almost imperceptible to the eye. Here a 9-ton load is lowered to ordinary household scale on table.



2. *Closer and closer it comes.* No jerks — just a carefully controlled movement as load nears scale.

Seeing is Believing

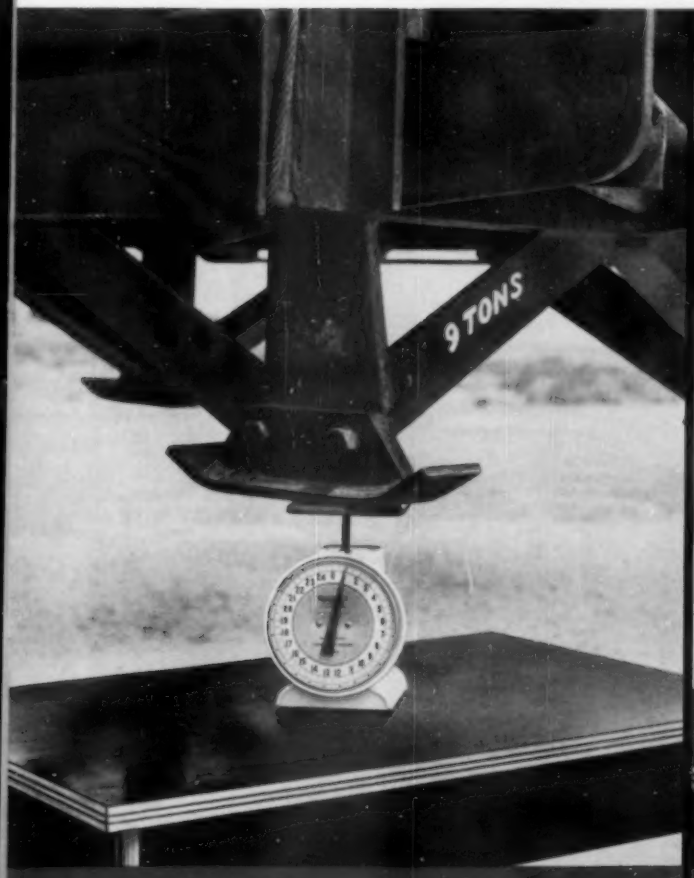
The experiments illustrated here were made at Bucyrus-Erie's test and research grounds near South Milwaukee. The machine used was a standard H-5 Hydrocrane — no special additions or adjustments were made. The load being lifted was made up of a sled and billets totaling 18,363 pounds as weighed on a certified scale.

H-3 HYDROHOE

H-3 HYDROCRANE
4-TON, 3/8-YARD

H-5 HYDROCRANE
9-TON, 1/2-YARD

BUCYRUS ERIE
South Milwaukee, Wisconsin



3. *Contact!* And so-o-o easy that scale registers only one pound of that big 9-ton load. That's precision control in action!

4. *Now the operator "feathers" his control lever* a hair, and look — the scale pointer moves to a pound and a quarter!

News . . .

Continued from page 38

and even to jack the slab back to its original height, restoring the pavement to nearly new condition. Throughout the entire undersealing job which was centered for many miles near the middle of the Turnpike, there was not a single delay caused by the asphalt crew waiting on pavement drillers.

Welders Meet in May

The fourth annual Welding show sponsored by the American Welding Society will be held in Memorial Auditorium, Buffalo, N. Y., May 9-11. One hundred companies have scheduled exhibits at the exposition, which will be the largest ever held in the industry.

The Society will conduct its annual business meeting and a series of technical conferences in conjunction with the show. Technical and business sessions will be conducted at the Hotel Statler. A total of 21 technical sessions, with approximately 50 speakers, are planned.

Events scheduled include live demonstrations of welding processes and equipment.

Thomas J. Keefe

Thomas J. Keefe, 64, veteran executive consultant of the American Road Builders' Association, died December 17 in Bethesda Naval Hospital, Washington, D. C.

Keefe was well known from coast to coast among men in the highway industry and the engineering profession. He had developed friendships with numerous members of Congress and of the federal executive branch.

Mr. Keefe began his career with the Keystone Automobile Club of Philadelphia, Pa., then came to Washington as managing director of the American Motorists Association. For approximately 30 years, he served as an executive of the American Road Builders' Assso-ciation.

A native of West Philadelphia, Mr. Keefe lived at 4411 Bradley Lane, Chevy Chase, Md. He is survived by his wife, Elizabeth, and four children.

Maine Turnpike Grows

The Portland to Augusta extension of the Maine Turnpike was recently opened. The new section is part of a high speed controlled access highway extending from Maine's southern border to its capital at Augusta.

Design and construction of the turnpike provides safe and comfortable motor vehicle travel. Opposing lanes of travel are separated by a 26-ft. center strip. There are 10-ft. wide safety shoulders on both sides for its entire length. With gradual curves and easy grades, it permits a uniform rate of speed from beginning to end. The speed limit is set at 60 miles per hour. There are no traffic signals, advertising signs or cross traffic.

Fourteen interchanges are located along the main line. Major interchanges are provided for the cities of Biddeford, Saco, South Portland, Portland, Westbrook, Auburn, Lewiston, Gardiner and Augusta.

The expected traffic for 1956 is 5,-162,000 vehicles. Revenue from tolls

Aerial view shows a recently opened section of the Maine Turnpike, 17 miles north of Portland. Turnpike is 106 miles long.

and concessions for the same year is estimated at $4,815,000.

NAM Elects Swigert

Ernest G. Swigert, president of Hyster Co., Portland, Ore., has been elected national vice president of the National Association of Manufacturers. The announcement was made during the NAM's 60th annual Congress of American Industry at New York. Swigert has served on NAM's board of directors for a number of years and during 1955 served as regional vice president of the organization.

Reservoirs Help Cut Floods

Multipurpose reclamation dams and reservoirs reduced the flood crest during December in the Central Valley of California and in other western areas by virtually shutting off the upstream flow of several major rivers at their peak, government sources said.

A preliminary Bureau of Reclamation report indicated that the Sacramento and San Joaquin rivers in the Central Valley were flowing at 293,000 cfs above Shasta and Millerton lakes, respectively, but that releases from Shasta and Friant dams were controlled to only 3,200 cfs.

In the nine-day peak flood period, Dec. 17-26, 1955, these two reservoirs stored 1,421,300 acre-feet of water. This would be sufficient to put 2,220 square miles under one foot of water.

At the same time, Folsom Dam on the American River, which was built and is presently operated by the Corps of Engineers, stored an additional 890,000 acre-feet of water and reduced the peak flow on this stream from 218,000 to 70,000 cfs. This reservoir is to be transferred to the Bureau of Reclama-

Moderate cost . . . light on labor
little maintenance . . . BUT

Crescent Scraper of 5-cu. yd. capacity—rigged for gravity return—shown returning to excavation point in the pit. Ask for Catalog A.

SAUERMAN EQUIPMENT

Check digging power . . . rate of haul . . . clean dumping. Add labor economy . . . low upkeep . . . personnel safety . . . moderate power consumption. Total up the score . . . you'll choose one of these Sauerman Machines for your operation.

DRAG SCRAPER: *best* for pit or hill excavation, reclamation or general handling of materials, wet or dry. Serves as rapid, long range conveyor. Sizes 1/3 to 18 cu. yds.

SLACKLINE CABLEWAY: *best* for deep digging — especially underwater — and conveying to a high delivery point. Reaches down a hundred feet or more . . . spans up to 1000 ft. . . . sizes 1/3 to 3½ cu. yds.

TAUTLINE CABLEWAY: *best* for long range aerial work. Lifts, conveys, places loads of unwieldly material. Ideal for dam construction or for conveying loads over streams and canyons.

CRESCENT SCRAPER ON BOOM MACHINE: *best* for increasing the work capacity of any boom machine on backfilling and grading jobs. When scraper is used with track cable and trolley, machine range is greatly extended.

Call on Sauerman's *experienced* engineers for the size and type system *best* suited to your digging, hauling or materials handling requirements. Write for catalogs . . . ask for idea-packed Sauerman News.

Slackline cableway performs difficult excavation of non-caving material from deep pit. 70% rock and 30% colloidal sand posed tough digging job. Ask for Catalog C and Field Report 216.

Tautline Cableway spans 920 ft. to carry 4-cu. yd. bucket of concrete from mixing point to dam site.

Crescent on boom machine dumps large load of wet peat. Bucket is gravity-returned on track cable to digging point. Ask for Catalog J-1 and Field Report 228.

SAUERMAN BROS. INC.
622 S. 28th AVE. | BELLWOOD, ILL.

A study in contrast is offered in the Goodyear tire line. The large tubeless tire, for earthmovers, weighs a ton and sells for more than $5,000. The model holds the firm's smallest industrial tubeless tire. It weighs three pounds, sells for $6.

tion next spring for integration with the Central Valley project.

The principal flood contributors were the Feather and Yuba rivers on which there are no Bureau of Reclamation structures, although some were contemplated and some sites surveyed in the compiling of the Central Valley comprehensive water resources development report several years ago. The proposed development included almost complete control of floods by addition of reservoir storage to supplement the system of levees, channels and cutoffs on the main valley floor.

The Bureau of Reclamation report estimated that without flood storage at Shasta Dam and reservoir, the peak flow of the Sacramento River would have been 310,000 cfs. This would have caused a flood stage above that reached in 1940, when large segments of the Sacramento River levee system failed and 635,000 acres of land were inundated between Rio Vista and Red Bluff.

The last major flood on the San Joaquin occurred in 1938, before Millerton Lake was created by the construction of Friant Dam. The peak flow at that time was 75,000 cfs, compared with a peak flow this year of 92,000 cfs which was reduced to a flow of 200 cfs immediately below the dam.

An unusual flood control measure in the hard hit delta section of the Central Valley involved the opening of cross channel gates which are ordinarily closed to keep the Sacramento River out of the Mokulumne delta. In this instance, the gates were opened to permit an unprecedented flow from the Mokulumne and San Joaquin drainage area to enter the Sacramento, thus finding a quick outlet into San Francisco Bay.

Across the Sierras in the Truckee River drainage basin, the warm rains quickly melted an early winter snow pack. The Donner Pass pack was reduced from 70 to less than 24 inches. Reservoir storage on the Newlands Project, one of the first constructed by the Bureau of Reclamation nearly 50 years ago, provided some storage space but not enough to control the floods on the Truckee River which bisects Reno. The gates of the Lake Tahoe outlet were closed during the entire period of the flood, and Boca reservoir was filled to capacity.

A combination of two Bureau of Reclamation dams, Arrowrock and Anderson Ranch, and the Lucky Peak Dam of the Army Corps of Engineers reduced the flow of the Boise River in southwestern Idaho to virtually nothing at Boise, permitting the Payette River, which was draining heavily, to drain away into the Snake without damage. Even Payette River flows were materially reduced by the existence of reclamation dams on the river. The Snake absorbs both the Boise and Payette Rivers within a short distance of each other in the heart of the rich irrigated area of southwestern Idaho.

Storage operations on the Yakima project in central Washington also pre-

Continued on page 48

Emmet R. Galvin, Sr.

Emmet R. Galvin, Sr., 70, assistant to the president and general manager of the Buda Division, Allis-Chalmers Mfg. Co., Harvey, Ill., died December 27. Mr. Galvin was active in the construction machinery field since 1925. He was a member of the American Road Builders' Association and was president of the manufacturers division in

1943-'44. He is survived by his wife, Deva; three sons, Emmet R., Jr., Minneapolis, Minn., Jay, Ada, Okla., and John, Flossmoor, Ill.; three daughters, Mrs. Deva Swords, Downers Grove, Ill., Mrs. Dorothy Power, Corpus Christi, Tex., and Mrs. Mario Sutorius, Homewood, Ill.; and 10 grandchildren. Burial was in Peoria, Ill.

for MARION Owners

Many folks think Groundhog Day comes once a year, but you can see MY shadow every day — I represent the spirit of Marion and I'm on the move, going places. You'll never see me physically except in print, but you'll find my shadow around every Marion machine. I'm the invisible helper who makes your Marion air controls work so easily and smoothly, who packs the Sunday punch that wins on extra heavy jobs. I help give you the stability, speed, power, and strength you like on your Marion. I'm the guy, too, who will help you get the service you need, when you need it.

I can do all of this because I combine the many intangible things that make Marions worth more to you. I represent Marion's design and manufacturing experience, the skill and care of our craftsmen, our enthusiasm and loyalty for Marion owners, the sales and service facilities of our Distributors.

Many of the world's happiest contractors know me and like me for the help I've given them. I'd like to work for you, too, if you are not yet a Marion owner.

Your nearest Marion Distributor can help us get acquainted.

Whatever your job requirement, there is a Marion machine of the size and type for greatest efficiency. Your Marion Distributor is the man to see — he can save you money.

MARION Power Shovel Co.
MARION, OHIO

CAT* DW21 — NO. 470 LOWBOWL SCRAPER OUTLOADS COMPETITION IN ON-THE-JOB TESTS ON KANSAS TURNPIKE

1. TESTS WERE MADE on contractors' jobs on the Kansas Turnpike. They covered a period of three weeks. For each comparison, the competing units were loaded under similar conditions. Soil density tests were performed right in the loading area to provide an accurate measure of scraper load in pay yards.

2. FIELD ENGINEERS weighed load after load as the competing units passed over a portable platform scale. By subtracting average empty weight from average gross weight, they determined average net load weight. In every test, the No. 470 Scraper with exclusive Caterpillar Lowbowl design consistently carried larger payloads.

3. JOB STUDIES showed that the new turbocharged 300 HP DW21 Tractor had the "go" to equal or beat other units in cycle time while carrying more pay yards. Other features contributing to this unit's success were large 29.5-29 tires, an efficient power train, synchro-safe brakes and the fast, responsive No. 27 Cable Control.

4. LOWBOWL DESIGN, developed by Caterpillar, is a feature of the No. 470 Scraper. With this new concept, the bowl has been widened and lengthened, yet its depth has been decreased. But Lowbowl design is more than just dimensional changes. As the tests show, material is loaded with less resistance clear out to the end of the loading cycle.

TEST RESULTS

No. 470 Lowbowl Scraper (18 cu. yd. struck capacity) vs Competition

No. 470
AVERAGE LOAD
18.1
BANK CU. YD.

Scraper A
18 cu. yd. struck capacity
AVERAGE LOAD
14.8
BANK CU. YD.

LOWBOWL ADVANTAGE:
3.3 bank cu. yd. per load

Test conditions: Damp silty clay—density: 3300 pounds/cu. yd. **Weight Comparisons:** Average net load, pounds: No. 470—59,840; Scraper A—48,675.

Comments: On one load, the operator of Scraper A was asked to obtain maximum heap. It took 2.40 minutes of push loading to pick up a load which weighed 58,875 net pounds—less than the average load carried by the No. 470!

No. 470
AVERAGE LOAD
18.1
BANK CU. YD.

Scraper B
Sideboarded—
18 cu. yd. struck capacity
AVERAGE LOAD
14.3
BANK CU. YD.

LOWBOWL ADVANTAGE:
3.8 bank cu. yd. per load

Test conditions: Sandy clay. Density: 3100 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470—56,225; Scraper B—44,400.

Comments: Average loading time for both machines was comparable. In total cycle time, the DW21 had the advantage. Its transmission provided a better match to rimpull requirements, and its shorter turns saved time on the fill.

No. 470
AVERAGE LOAD
18.1
BANK CU. YD.

Scraper C
18 cu. yd. struck capacity
AVERAGE LOAD
14.3
BANK CU. YD.

LOWBOWL ADVANTAGE:
3.8 bank cu. yd. per load

Test conditions: Damp silty clay. Density: 3300 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470—59,840; Scraper C—47,290.

Comments: Scraper C, like Scraper A and the No. 470, has a rated capacity of 18 cu. yd. struck. On the job, where results, not rated capacities, are the true yardstick of a machine's ability, the No. 470 Scraper with Lowbowl design decisively outloaded the other two.

No. 470
AVERAGE LOAD
15.6
BANK CU. YD.

Scraper D
Sideboarded—
18 cu. yd. struck capacity
AVERAGE LOAD
13.3
BANK CU. YD.

LOWBOWL ADVANTAGE:
2.3 bank cu. yd. per load

Test conditions: Heavy clay. Swell about 40%. Density: 3440 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470—53,550; Scraper D—45,630.

Comments: In the tests, Scraper D scored next best to the No. 470. *Scraper D is the "old" DW21-No. 21,* a unit that set records for high production at low cost the world over. Now, in the new DW21-No. 470, Caterpillar has produced a unit that's even better—and way ahead of competition!

Results on the job, not rated capacities, are the only true measure of a machine's ability to produce. Check the results here and judge for yourself how much the *extra yards* moved by the DW21-No. 470 Lowbowl Scraper can mean *profit-wise* to you!

Your Caterpillar Dealer has a complete report of this on-the-job test on the Kansas Turnpike—as well as similar reports from other sections of the country. Ask him to show you the advantages of Lowbowl Scrapers on your job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BIGGER, FASTER LOADS WITH LOWBOWL SCRAPERS

News . . .

Continued from page 44

vented any flood damage where rivers were building up to flood stage during the heavy rains.

High flood peaks in the Rogue River basin in Oregon caused the Hopkins Flume, a Hopkins Canal diversion dam on Deer Creek, to go out. This private installation was one scheduled for replacement by the Bureau of Reclamation this summer as part of a rehabilitation program for which funds have been appropriated by Congress. The Bureau also has prepared a comprehensive flood control and water development program for the Rogue River basin.

Air Academy Work Begun

Construction of the United States Air Force Academy, now confined largely to preliminary development of the utilities system, is expected to be in full swing at Colorado Springs, Colo., by the latter part of 1956.

Col. Albert E. Stoltz, director of the Air Force Academy Construction Agency, announced that construction of the cadet quarters and the academic buildings would begin sometime next fall. Contracts for clearing and grading the area and for construction of the retaining walls and foundations of the academic area will be awarded in March.

Roads continue to dominate the early phases of the construction program, according to the schedule released by Col. Stoltz. Nowers Construction Co., Pueblo, Colo., is completing the first segment of nine miles.

Bids will be opened in April for an electrical and communications system for the Academy site. The May construction program calls for awarding of contracts on bridges, sewers, gas and heating mains, followed by construction of a sewage treatment plant starting in June.

First actual construction of buildings, other than the models for the cadet quarters, will be that of the service and supply area to be built approximately two miles northeast of Breed underpass between the Santa Fe and Denver and Rio Grande railroads. This complex will include warehouses, storage buildings, automotive repair shops and air installations offices.

"So far, I think No. 3 shows the best shock resistance."

Beavers Hold Dinner

Prominent western construction men were honored at the first annual awards dinner of the Beavers January 27 at the Hotel Statler, Los Angeles, Calif. Awards were presented in the following divisions:

Management: Guy F. Atkinson, Guy F. Atkinson & Co., South San Francisco, Calif.; Herman Brown, Brown & Root, Inc., Houston, Tex.; Henry J. Kaiser, Oakland, Calif., and Harry Morrison, Morrison-Knudsen Co., Inc., Boise, Idaho.

Supervision: Lee T. Grider, Los Angeles, Calif.; Harvey Slocum, Alhambra, Calif.; B. Williams, Boise, Idaho, and C. W. Wood, Seattle, Wash.

Engineering: Julian Hinds, Santa Paula, Calif., B. F. Jakobsen, Menlo Park, Calif., and Maj. Gen. Thomas A. Robins, Portland, Ore.

Supply: Nathan Bowers, Atherton, Calif., and J. S. Foster, Orangeburg, S. C.

Posthumous awards were made to William R. Ellis, Guy LeRoy Stevick and John P. Shirley, all of whom had been active in western construction work until their deaths last year.

The newly formed Beavers group is composed of builders of heavy engineered construction projects west of the Mississippi River, and including Alaska, the Philippines and the Pacific area.

The Beavers' board of directors includes George H. Atkinson, Herman Brown, Allen D. Christensen, L. E. Dixon, S. M. Griffith, S. E. Hunkin, Algot F. Johnson, William A. Johnson, Henry J. Kaiser, Guy C. Kiddoo, E. L. Kier, Peter Kiewit, John MacLeod, J. C. Maguire, A. B. McEachern, B. H. Mercer, Harry W. Morrison, F. W. Parrott, John M. Server, Jr., and J. Perry Yates.

N. Y. Engineers Will Meet

The New York State Society of Professional Engineers will hold its 30th Engineering Industries Exposition in conjunction with its annual convention May 17-19 at the Statler Hotel in New York City.

The Consolidated Edison Co. will exhibit a scale model of the reactor which it is constructing at Peekskill, N. Y., to supply atomic power to New York City.

George Baer, professional engineer of the Foster-Wheeler Corp. and a member of the Westchester chapter, is the chairman of the convention committee.

4-wheel-drive PAYLOADER® gets around!

The quick acceptance and success of the 4-wheel drive tractor-shovel probably has no parallel in construction equipment history. Pioneered and first introduced by Hough in 1948, this type of machine is numbered in the thousands among contractors, pits and quarries, public bodies, mines and industry.

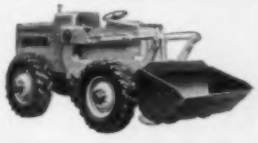
Hough leadership and pioneering in the 4-wheel drive field continues and is presently represented by three new "PAYLOADER" sizes — all incorporating the "know-how" and new features that result in better performance — more production, easier and faster — at lower net cost.

All three have powerful pry-out action and 40 degree bucket tip-back at ground level to dig faster, get bigger loads and carry bigger loads — safely. All three have more powerful engines — a choice of gasoline or diesel — and many other more-yardage features.

Your "PAYLOADER" Distributor is eager to show what these new units can do — for you.

a choice of 3 new sizes

MODEL HO
2 cu. yd.



MODEL HH
1½ cu. yd.

MODEL HU
1 cu. yd.

THE FRANK G. HOUGH CO.
708 Sunnyside Ave., Libertyville, Ill.

Send full data on new 4-wheel drive "PAYLOADER" tractor-shovels.

☐ Model HO ☐ Model HH ☐ Model HU

Name .....

Title .....

Company .....

Street .....

City .....

State .....

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Equipment You Ought to Know About

Cat Grader Attachments

Manufacturer: Caterpillar Tractor Co., Peoria, Ill.

Claims: Three new hydraulic attachments for its No. 12 and No. 112 motor graders have been developed by Caterpillar. They are a hydraulically shiftable moldboard, hydraulically operated snow plow and bulldozer mounting and hydraulically actuated snow wing.

The new shiftable moldboard is concave in shape to allow for the hydraulic cylinder. The stroke of the cylinder is 48 inches, with 27 inches of travel to the right and 21 inches to the left. Standard moldboards will be equipped with a slide bar in place of the cylinder to allow for manual offset of the blade.

Improved design and strength are featured in the new snow plow and bulldozer mounting. The cylinder is controlled by a four-position valve that allows floating but gives down pressure when desirable.

"Direct-Reading" Meter

Manufacturer: John W. Hobbs Corp., Division of Stewart-Warner Corp., Springfield, Ill.

Claims: Hobbs has added a "direct-reading" meter to its line of engine hour meters.

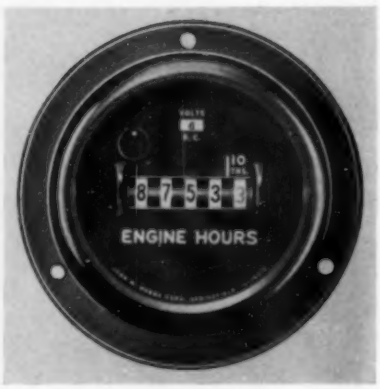
When the first Hobbs engine hour meters were introduced 17 years ago, the direct-reading type was employed in the initial models. This construction had to be dropped, however, because odometers available at that time would not assure consistent performance.

Lightweight indicator pointers, which assure consistent performance of the meters at the voltages for which they were made to operate, were adopted.

Many original equipment manufacturers plus the owners and operators of powered equipment have sought a direct-reading meter to supplement the pointer-type models. After much research and testing, Hobbs produced such a meter with the same timing mechanism that is used in the pointer-type models.

The Hobbs direct-reading meter is read in much the same way as the odometer in an automobile's speedometer. Black figures show at a glance the total number of hours an engine has been operating; the red figure at the right indicates tenths of hours (6 minutes). A rotating disc in the upper left segment of the face of the meter acts as an operating indicator, making one revolution a minute. The meter registers up to 10,000 hours, then returns to zero.

The meter is a true timing instrument (not a revolution counter); the timing mechanism is an electrically-



wound clock which records the hours and minutes of engine operation. It is designed to indicate the actual time of operation of any gasoline or diesel engine-powered equipment.

The meter is available in 6, 12, 24, 32, 64 and 110-volt models in three basic types — standard (mounted with 3 screws), flush-mounting (held in place by a stirrup, no screws required) and aircraft (standard aircraft installation.)

Welder for Hardfacing

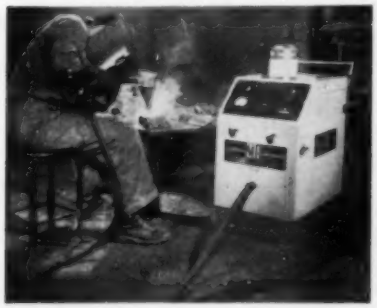
Manufacturer: Amsco Div., Ameri-

"That's it. Approach him in a friendly cajoling manner and ask him to get the hell to work!"

can Brake Shoe Co., Chicago Heights, Ill.

Claims: Amsco has made available a portable welding machine designed specifically for manganese steel and hardfacing work on irregularly-shaped parts. The machine, called the MF welder, was tested for two years. Production models have been used on the Massachusetts Turnpike and the St. Lawrence Seaway jobs and in heavy maintenance and welding shops.

The MF Welder, mounted on large industrial casters and displacing no more space than an average floor model tele-



vision set, is designed to plug into conventional AC or DC welding units by a single cable. The MF operates on a current range of from 150 to 450 amps.

The MF serves as a semi-automatic device for feeding flux-coated welding wire to parts of machines or implements being "re-treaded" with new metal after original surfaces have worn away.

One of the features of the new welder is the self-feeding mechanism for keeping the welding arc constantly supplied with welding wire at a rate exactly and instantly proportional to the size of the arc. A conical "hopper" is mounted directly above the welding wire outlet as a means of storing and feeding flux. The flux adheres to the wire by the magnetic field created by welding current. Each one-quart refill from the hopper serves for 15 minutes of welding.

The MF is a companion to Amsco's package automatic welder which automatically hardfaces new metal upon circular shapes by way of a submerged, self-feeding arc. The automatic design, however, could not be used for odd-shaped parts in need of hardfacing, including dipper teeth, sprocket teeth and edge cutters.

The "semi-automatic" feature, says Amsco, will enable an inexperienced welder to lay down acceptable deposits of hardfacing with little practice. Pri-

SAFETY INSURED—When a 41,300-lb. section of stone crushing equipment was placed by an American 700 Series Crawler Crane, Crosby Clips were used on all wire ropes to assure maximum safety for men and equipment. Genuine drop-forged, hot-dip-galvanized Crosby Clips, with the famous Red-U-Bolt, are specified for safety on more jobs than any other drop-forged wire rope fasteners.

STRONG SAFE, BLOCK

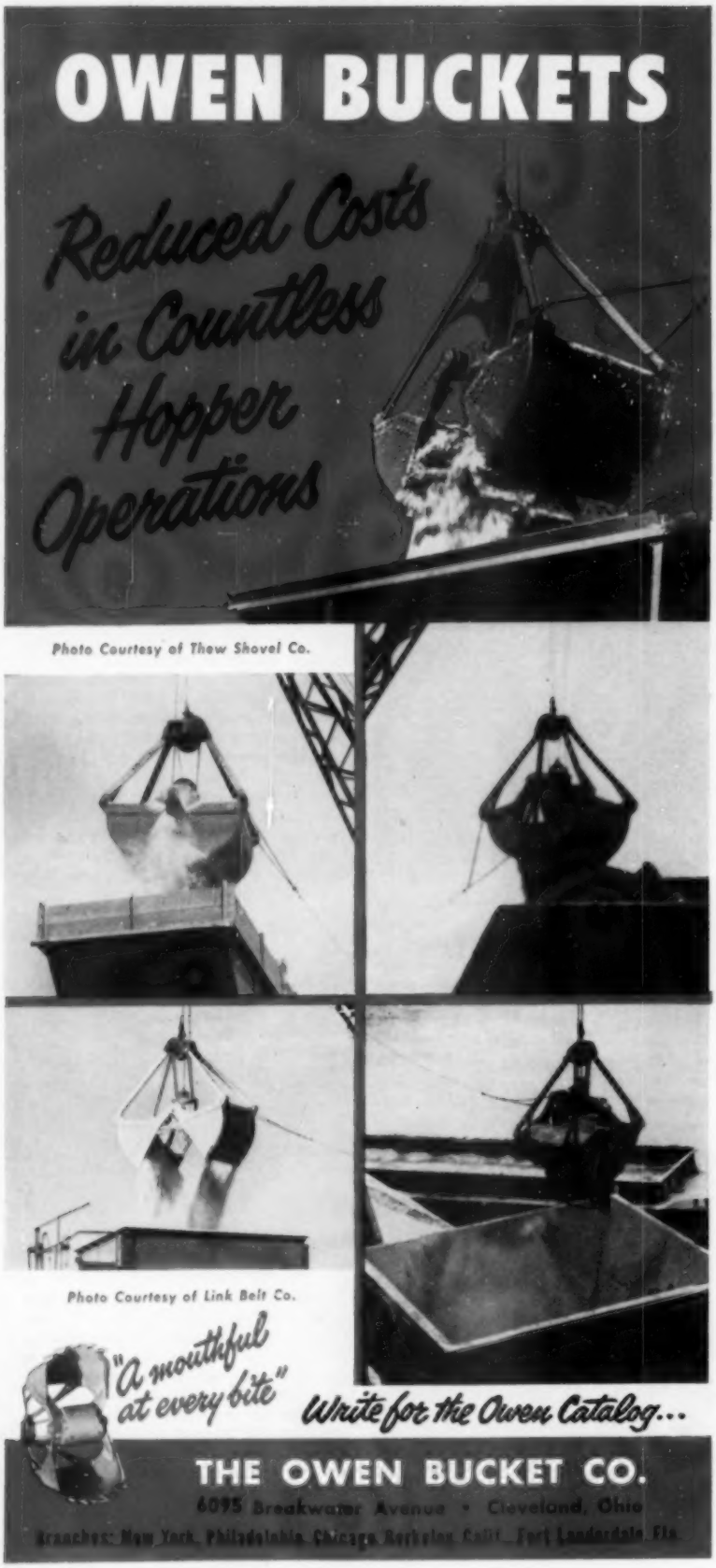
When cofferdam sheetings were about to be drawn from the sucking, grasping soil of the Platte River bottom, a Load-Rated Crosby Crane Block was specified. Made of highest-quality steel, and engineered for safety as well as efficiency, Crosby Blocks are backed by the famous Crosby name—recognized leader in safety. When using Crosby Blocks, workmen can't go wrong, for the safe lifting capacity is embossed right on the side plates.

EASY TAKE-UP

Important design advances by the makers of famous Laughlin Turnbuckles offer added safety and efficiency to users in the construction field. Laughlin Turnbuckle bodies have extra-heavy hex ends which allow fast, easy take-up with a wrench. An exclusive eye design takes the ear of a shackle one size smaller and is stronger than conventional eyes because it conforms more closely to the lines of pull. This design also makes it easier to attach thimbles and other fittings. Exceptionally strong, Laughlin hooks have added heft at points of greatest stress—the ¼-inch hook is actually stronger than most $\frac{5}{16}$-inch hooks. Available in a complete range of sizes. A reference chart in Laughlin's free catalog lets you select the proper size turnbuckle for each job.

ATTACH IN SECONDS

A more efficient clevis grab and slip hook made by Laughlin has a "Crimp Style", cotter that can be removed and attached in seconds. Available in a complete range of sizes at distributors everywhere, Laughlin Clevis Grab and Slip Hooks are made of drop-forged steel special forging quality and are heat-treated for maximum strength. For free catalog on the complete Laughlin and Crosby lines, write the Thomas Laughlin Division, Portland, Maine, or the American Hoist & Derrick Co., St. Paul 1, Minnesota.


OWEN BUCKETS
Reduced Costs in Countless Hopper Operations
Photo Courtesy of Thew Shovel Co.
Photo Courtesy of Link Belt Co.
"A mouthful at every bite"
Write for the Owen Catalog...
THE OWEN BUCKET CO.
6095 Breakwater Avenue • Cleveland, Ohio
Branches: New York Philadelphia Chicago Berkeley Calif. Fort Lauderdale Fla.

marily, however, the feature is offered as an aid to the skilled welder.

In operation, the MF Welder produces a visible arc which fuses metal and flux upon the metal being welded or built up. At the same time, the flux serves as the means of obtaining the desired hardfacing composition. Fluxes available include manganese steel, martensitic iron and martensitic steel.

The MF uses the arc's current potential to govern the speed of a motor-driven wire-serving device. Should the operator pull away from his work, the reel drive speeds up to feed wire faster. If he moves towards his work, the drive slows down to feed more slowly. This self-compensating feature holds the arc steady at a given length set on the operator's control rheostat.

The MF's flux hopper is balanced so that the whole hand-held assembly has a "feel" equivalent to that of conventional welding rod holders. Wire enters the hopper at one side and passes to its work on the other side; the flux, meanwhile, joins the wire at a gate flanked by several small permanent magnets. These magnets cause the flux to bunch up at the opening to prevent its escape when the machine is not running. In operation, however, the greater magnetic pull of the current-carrying welding wire causes flux to adhere and join in the fusing process. The ratio of flux to wire may be controlled by changing the size of the opening or by the variations in flux particle sizes available.

Air-Operated Rock Drill

Manufacturer: Thor Power Tool Co., Aurora, Ill.

Claims: A new version of its Model 75 rock drill has been developed by

Thor. To be known as Model 77, the new air-operated tool features a recently developed latch-type front head that assures a positive lock when pulling drill steels if it is mounted on a sinker leg.

Like its Model 75 counterpart, the new rock drill, which weighs 55 pounds, is designed for drilling holes up to 20 feet in hard-type rocks. It is fitted for such heavy-duty assignments as shaft sinking, quarrying, road building and all general rock removal tasks.

Koehring Cruiser Crane

Manufacturer: Koehring Co., 3026 W. Concordia Ave., Milwaukee 16, Wis.

Claims: Koehring is producing a Cruiser Crane version of its Model 205 excavator. The crane has a 15-ton lift-capacity, ½-cu. yd. dipper capacity and a top travel speed of 21 mph.

The crane is handled by one man from the same control position for both travel and work. One engine supplies all the power. The unit has 4-wheel drive.

Other crane features include power steering, air-hydraulic brakes and a standard torque converter. The unit has a turning radius of 27½ feet.

The unit's chassis is all welded. The body is equipped with outriggers front and back. The turntable swings on four adjustable hook rollers. The standard 25-ft. boom can be lengthened to a maximum of 55 feet. Straight boom jibs range from 15 to 30 feet. Safety boom limit stops are standard equipment, as is power boom lowering.

The unit weighs 29,400 pounds. The rear axle load, without counterweight, is listed at less than 18,000 pounds.

Special Tread Tires

Manufacturer: B. F. Goodrich Co., Akron, Ohio.

Claims: A Power Express tubeless truck tire with a special "armor coat" of X-99 tread compound has been introduced by Goodrich. Available for both original equipment and replacement use, the new tire is built to meet tubeless tire and rim assembly measurement requirements standardized by the Tire & Rim Assn.

The X-99 compound helps prevent tread cracking and checking, improving tire life. It remains in the tread contours between the ribs to provide full protection during the life of the tread.

The Power Express tubeless tire, mounted on a new drop center rim assembly, brings an over-all weight reduction of approximately 40 pounds per wheel on popular tire sizes, according to the manufacturer. It will be available to cover the load capacity ranges of tire sizes previously covered by conventional truck tires in sizes 6.00-16 6-ply, through 11.00-24 12-ply. The over-all dimensions of the new tires will be the same as the conventional tires.

Gooseneck Trailers

Manufacturer: Transport Trailers, Inc., Cedar Rapids, Iowa.

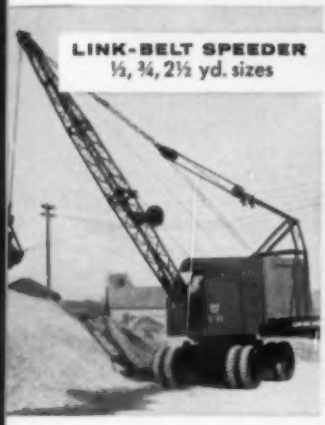
Claims: Simplicity of design and ease of operation are major features of the new Transport Trailer Model GPR removable gooseneck trailers. Developed to provide greater safety and convenience in loading and unloading heavy equipment for transport in congested areas, the trailers are available with flat or drop platforms and as beam trailers

Continued on page 56

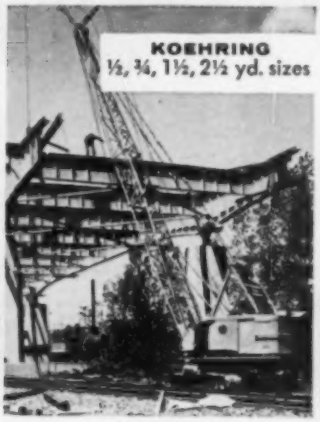
"Yeah, nice dewatering job . . . on the wrong excavation!!"

GET MORE WORK

FROM SHOVELS, CRANES, DRAGLINES

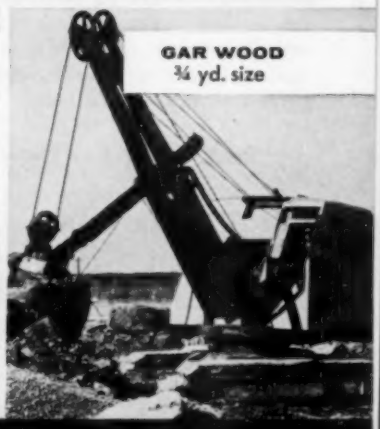


LINK-BELT SPEEDER
½, ¾, 2½ yd. sizes



KOEHRING
½, ¾, 1½, 2½ yd. sizes

BUCYRUS-ERIE
⅜, ½, ¾, 1, 1½, 2, 2½, 3 and 4 yd. sizes



GAR WOOD
¾ yd. size

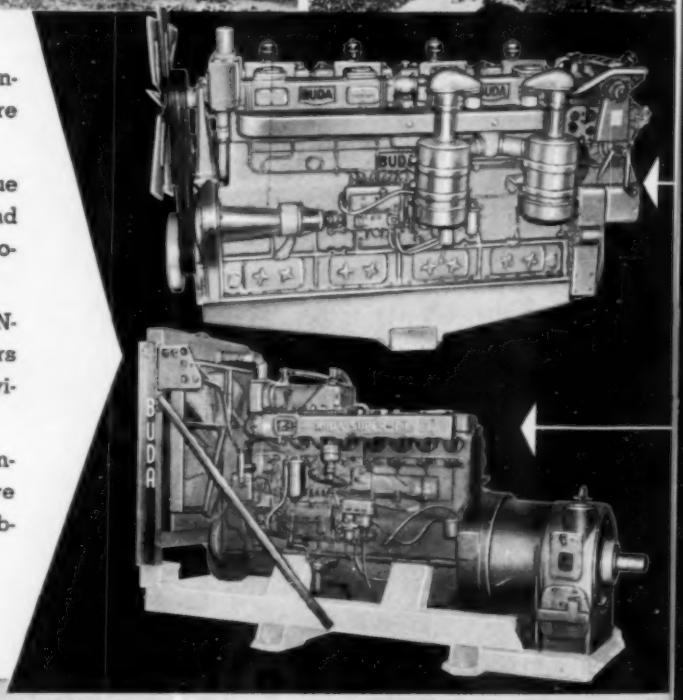
Specify or install an Allis-Chalmers Diesel or gasoline engine in any of these shovels, cranes or draglines and insure your investment in your machine.

BIG, RUGGED WORKHORSE ENGINES with high torque in the normal operating range, they have the power and stamina to give you smoother, faster cycles for greater production, year in and year out, on any kind of job.

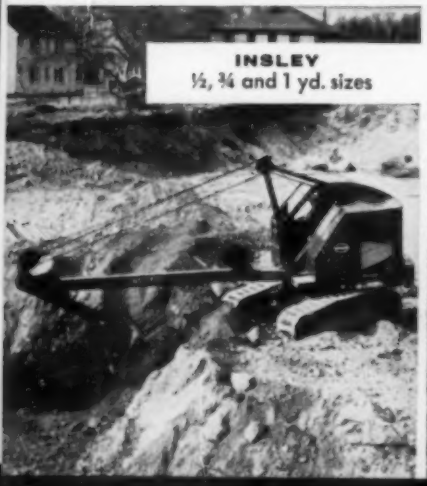
SIMPLE IN DESIGN . . . EASY TO SERVICE AND MAINTAIN—smokeless, quiet and smooth-running, Allis-Chalmers engines are packed with features that will pay you dividends in low cost, high production operation.

FOR EYE OPENING FACTS on how Allis-Chalmers engines make shovels, cranes and draglines more productive at less cost, see your nearby Buda Division Engine Distributor soon.

ALLIS-CHALMERS, BUDA DIVISION, MILWAUKEE 1, WISCONSIN



BC-36



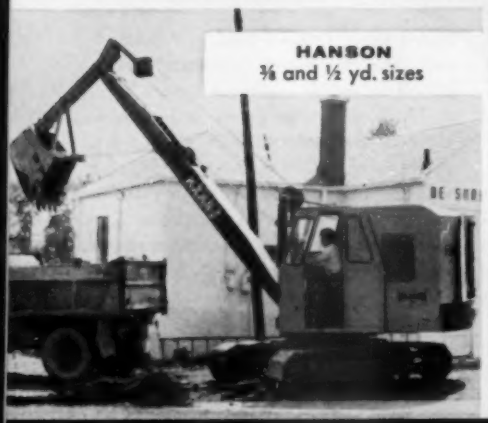
INSLEY
½, ¾ and 1 yd. sizes

AMERICAN
¾ and 1½ yd. sizes

MARION
¾, 1, 2, 2½ yd. sizes

...at less cost

POWERED BY ALLIS-CHALMERS ENGINES



HANSON
⅜ and ½ yd. sizes

P & H
3½ yd. size

QUICK-WAY
¼, ⅓ and ⅜ yd. sizes

FULL RANGE OF DIESEL AND GASOLINE POWER

Diesel

Model 8DC-2505 388 h.p.

Diesel

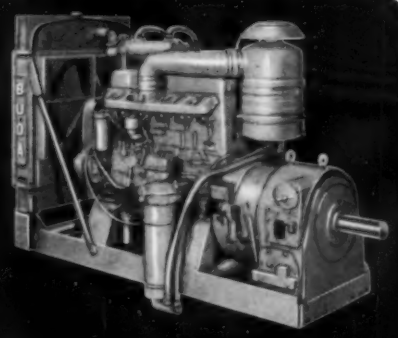
Models 6DA-779, 6DA-844 and 6DA-970 with Torque Converter 185, 215 and 240 h.p.

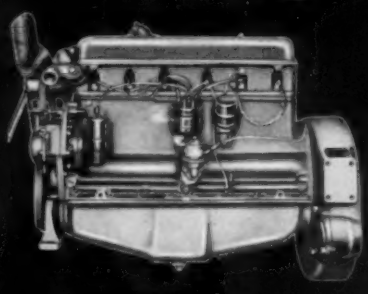
Diesel

Models 8DAS-1125 and 8DAS-1290 with Torque Converter 350 and 375 h.p.

Gasoline

Models 6B-230 and 6B-273 78 and 85 h.p.





SCHIELD BANTAM
⅜ yd. size

SARGENT
⅜ yd. size

LIMA
½, ¾, 1, 1½, 3½ yd. sizes

NORTHWEST
¾, 1 yd. sizes

MANITOWOC
2½, 3 yd. sizes

ALLIS-CHALMERS

A-C

New Equipment . . .

Continued from page 53

with or without removable side platforms and telescoping outriggers.

The removable gooseneck is attached through a simple, positive gooseneck connection which saves loading and unloading time. High strength design eliminates unnecessary added weight for maximum legal payload.

Other features include electrically-welded wide-flange-beam frame construction; tandem, triple or trunnion axle assemblies with heavy-duty roller bearings; 15 or 20-in. wheels; heavy-duty internal expanding brakes; and optional beavertail rear end designs. Capacities range from 15 through 60 tons for standard production models with special engineered units up through 100 tons.

Improved Armored Motors

Manufacturer: General Electric Co., Schenectady 5, N. Y.

Claims: An improved line of direct current armored motors with an advanced insulation utilizing Class H materials has been announced by General Electric.

Motors with the new Class H insulation are coming off production lines at G-E's Direct Current Motor & Generator Dept., Erie, Pa. G-E says that it is the first time that Class H insulation has been applied to the coils of direct current motors in regular production.

Company engineers report that the new insulation can withstand temperatures of 180°C. Its use in normal duty, they explain, virtually eliminates insulation failure as the limiting factor in continuous armored motor service.

The new insulation system, which includes the application of a specially developed silicone varnish, was installed in the popular MD-602 model for test. During the tests, the motor was subjected to severe overloads which produced motor temperatures as high as 200°C.

Connected to it was another MD-602 with the former Class B type insulation. To maintain an equal balance between them in both load and temperature, the two motors alternately functioned as motor and generator.

The motors were driven at four times their rated speed and were subjected to severe vibration. The shunt field circuit was abruptly interrupted at regular intervals to produce an inductive kick which would throw electrical stress on the field coil insulation.

The tests showed that the Class H insulated motor maintained excellent operating condition without apparent loss of dielectric or physical strength, contrasted with extensive burn-out damage in the motor with Class B insulation.

Engineers calculate that under identical operating conditions Class H insulation will outlast Class B by as much as 32 to 1.

Class H insulation has been adapted to three main sections of the armored motor—the field coils, armature coils and the main area of the armature insulation. In all these sections, past damage has resulted from high heat concentration.

Silicone treated mica mat is used on commutating and exciting field coils and on armature coils. Company engineers said that in laboratory tests this insulation had maintained full dielectric strength after samples had been heat cycled for 3½ months at 300°C.

All G-E Class H insulated coils may be interchanged with Class B coils in older motors of the line.

"... merely a formality, but in case of accident, whom do we inform?"

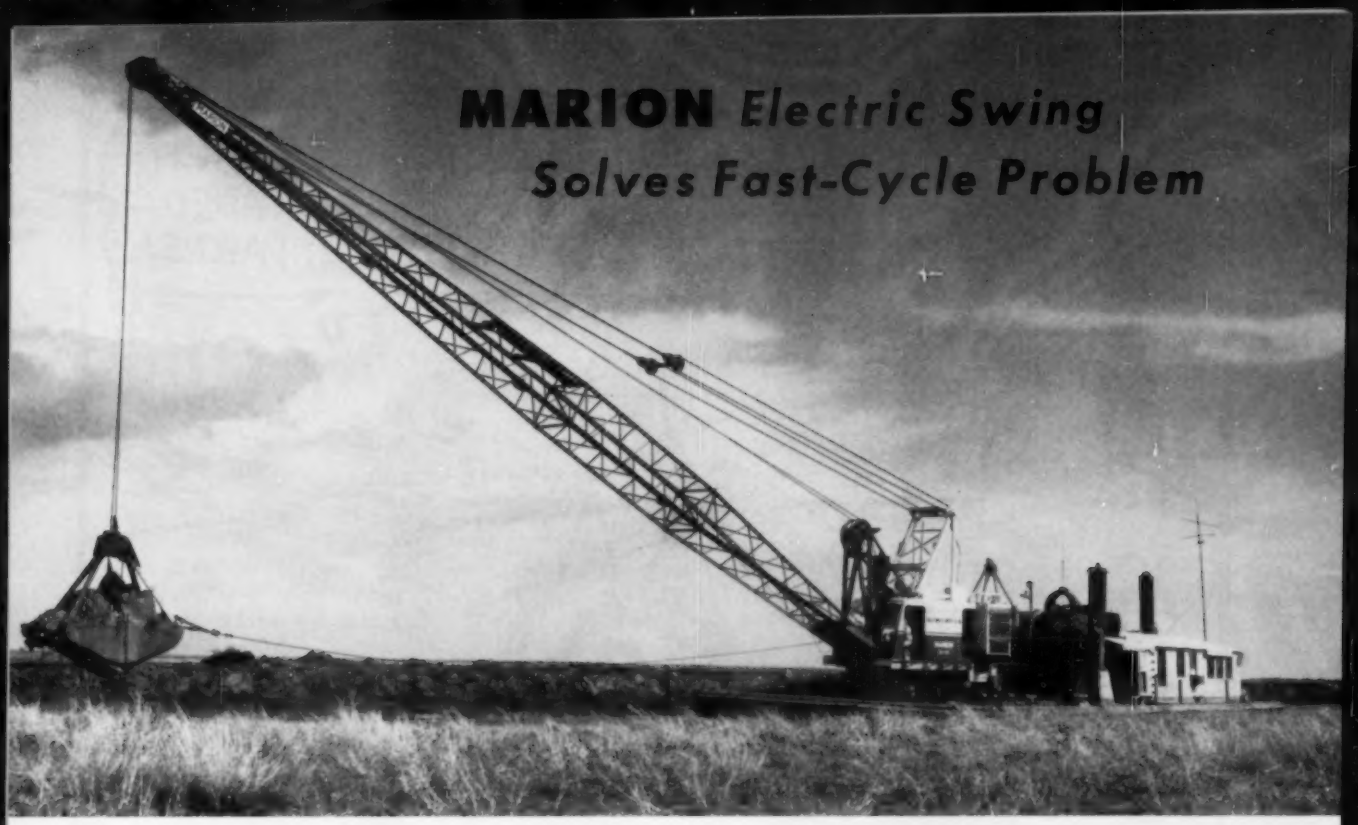
Rock Ripper for D9

Manufacturer: American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif.

Claims: ATECO has announced the development of an extra heavy-duty tractor-mounted rock ripper, the HRD9, specifically for Caterpillar D9 tractors. The HRD9 weighs more than 6½ tons.

The tractor mounting makes it easy to rip in corners and turn around in narrow cuts. The added weight of the ripper on the rear balances the front

Continued on page 62



Owner Calls 111-M "the first machine . . . 100% Satisfactory for barge work."

Swinging 5 to 6 yard loads of heavy clay every 30 seconds invites swing clutch problems on conventional clamshells. One Louisiana contractor who had spent 30 years in the business turned to MARION for the answer—and got it!

A five-yard Marion diesel clamshell with electric swing provides the speed and power for fast cycling of big loads in difficult digging (the marsh clay weighs 2800 lbs./yd.) Freed of clutch heat worries, the owner calls the Marion 111-M "the first machine I think is 100% satisfactory for barge work."

A third drum on the Marion provides a means of travel. The operator casts the clam bucket far ahead and uses the third drum to pull the barge forward at a speed of 7 miles per hour.

This machine moved 1,150,000 yards digging 23 miles of canals 34 feet wide and 10½ feet deep in a large marsh 65 miles south of Lake Charles, La. The work is part of a state wild life program to encourage wild ducks and geese. The canals make the area accessible by boat, and the spoil banks help ward off salt water.

Whatever your job requirement, there is a Marion machine of the right size and type for greatest efficiency.

MACHINE	SHOVEL CAP. CU. YD.	MAX. CRANE RATING IN TONS @ 12' RAD. EXCEPT AS NOTED CRAWLER	TRUCK	WAGON	HOE CAP. CU. YDS.	ASK FOR BULLETIN NUMBER
MARION 32-M	¾	*17½	*25	*25	¾	416
MARION 43-M	1	*27	*35	—	1–1¼	415
MARION 362	1½	37	—	—	1½–2	398-D
MARION 372	—	43	—	—	—	—
MARION 83-M	2	60	—	—	2–2¼	414
MARION 87-M	—	75	—	—	—	—
MARION 93-M	2½	80	—	—	—	397-E
MARION 101-M	3	84	—	—	—	417
MARION 111-M	4	169	—	—	—	402-B

*Rated at 10' Radius in Accordance with General Practice.

MARION POWER SHOVEL CO.

MARION, OHIO, U. S. A.

Please send me Bulletin 402 on the Marion 111-M.

Name ..... Title .....

Company .....

Address .....

City ..... State .....

Best place to head for is your Caterpillar Dealer.

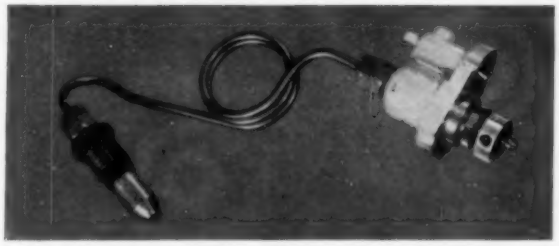
If the trouble's with substitute fuel injection parts, you should know this:

Original Caterpillar fuel pumps and injection valves are made from very special steel — the finest chromium alloy ball-bearing type. They're made with special tools in a special factory—only one of its kind in the world. Each pump is pre-set and given a 6-hour run-in. Single orifice design of valve cuts down possibility of fouling. In short, with Caterpillar parts you're sure of better performance, less down time.

With substitute parts, can you be sure of anything?

Better get Caterpillar original parts every time.

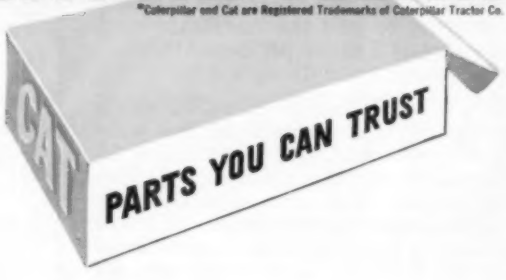
Caterpillar Tractor Co., Peoria, Illinois, U. S. A.



With clean fuel, CAT® fuel injection valves and pumps can last 20,000 hours and more. They are 100% interchangeable among cylinders of same engine or like models.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



NOT in the Contract

"Aren't you ashamed," the judge asked the man, "to have your wife support you by taking in washing?"

"Yes, I am, Your Honor," he replied. "But what can I do? She's too ignorant to do anything better."

A golfing clergyman had been beaten badly by a parishioner, 30 years his senior. He returned to the clubhouse rather disgruntled.

"Cheer up," his opponent said. "Remember, you win at the finish. You'll probably be burying me someday."

"Yes, but even then," said the clergyman, "it will be your hole."

A man walked into a bar and ordered two whiskeys. He drank one, poured the other into his shirt pocket and ordered two more. Then he repeated the process five or six times. Finally, the bartender wouldn't give him any more.

"You've had enough. And I don't like the way you're acting, pouring whiskey in your shirt pocket."

"Ah, mind your own business. I've a good mind to knock your block off!" exclaimed the customer.

Just then a mouse stuck his head out of his shirt pocket and said:

"And that goes for your darn cat, too!"

Joe sat beside his dying partner keeping the deathbed watch. Suddenly the dying man began to speak.

"Joe," he wheezed. "I have a confession to make. I robbed the firm of $10,000. And that's not all, Joe. I sold a secret formula to the competitors and I stole the letter from your desk that got your wife her divorce, and Joe . . ."

"That's okay, old man," Joe murmured. "I'm the one who poisoned you. . . . "

A reporter was told to cut his stories to bare essentials. His next story read:

"Q. Johnstone looked up the elevator shaft to see if the car was coming down. It was. Age 52."

"And so your daughter is to be married," the neighbor said to Mrs. Jones. "She's quite young yet. Do you think that she is ready for the battle of life?"

"Well, she ought to be," said Mrs. Jones. "She's been in three engagements already."

"And in conclusion, my dear students, I shall give you a demonstration of the evils of the Demon, Rum. I have here two glasses, one filled with water and the other with whiskey. I will now place a worm in each glass. Notice how the worm in the water squirms and vibrates with the very spark of life, while the worm in the whiskey writhes in agony, curls up and dies? Now, young man, what is the moral of this story?"

Young man: "If you don't want worms, drink whiskey."

Wife: "William, how do you suppose those dozens of empty bottles got into the basement?"

William: "I haven't the remotest idea. I never bought an empty bottle in my life."

Customer: "Have you a book called, *Man, the Master of Women?*"

Salesgirl: "Fiction counter to your left, sir."

A witty speaker was proposing a vote of thanks to the fat president of a luncheon club.

"There is a charming fable that when a baby is born, its guardian angel implants a kiss," he said. "If the kiss is on the brow, the child will be very intellectual; if on the eyes, very beautiful; if on the fingers, very artistic, and so on.

"Now, I cannot say where the angel kissed our president, but I do know he makes a very good chairman."

Two fleas had just finished a hard day at the circus. Said one to the other: "Shall we walk home, or take a dog?"

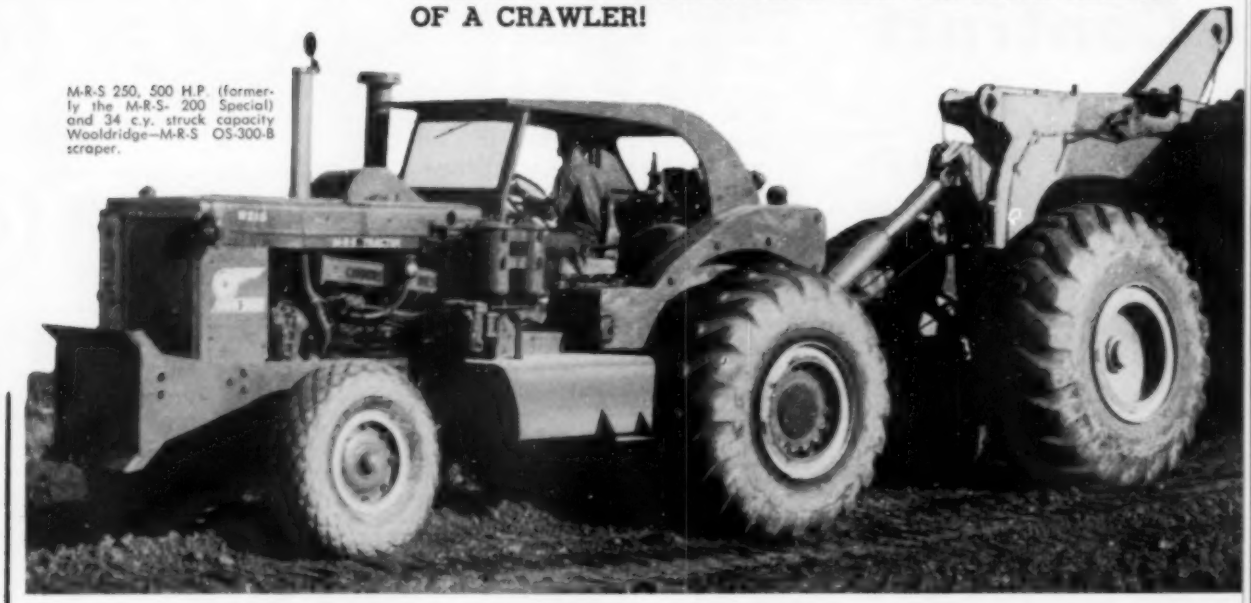
Sign on a butcher shop in London: "We make sausage for Queen Elizabeth II."

Sign on rival shop across the street: "God Save the Queen!"

"He'd be a much better man if he had more self-confidence."

Here's the prime mover you'll hope your competitor doesn't

WITH M-R-S TRACTORS YOU GET THE SPEED AND ECONOMY OF RUBBER PLUS THE TRACTIVE ABILITY OF A CRAWLER!



M-R-S 250, 500 H.P. (formerly the M-R-S- 200 Special) and 34 c.y. struck capacity Wooldridge—M-R-S OS-300-B scraper.

HIGHEST CAPACITY FOR THE BIG JOBS! Actual on-the-job comparative tests have proven time and again: **"The bigger the scraper; the bigger the profit!"** Now — M-R-S Tractors, with power ranging from 210 to **500** H.P., give you the **largest selection of high capacity earthmoving equipment in the world today!** Dependable power for efficiently **self-loading** scrapers up to **20 c.y. struck . . .** power for scrapers up to **34 c.y. struck capacity** with pusher assistance.

Why try to meet today's intense competition with yesterday's low performance equipment? Let us show you how modern M-R-S Tractors can mean higher profits for you in 1956 and for many years to come . . . through **higher capacity, faster hauling speeds, and superior maneuverability.**

INVESTIGATE BEFORE YOU INVEST! Contact your nearest M-R-S dealer or write today for full details on the M-R-S—Wooldridge hauling team . . . the earthmoving combination of the future, available for you today!

WRITE, WIRE, OR PHONE TODAY FOR COMPLETE DETAILS!

HERE'S AN EXAMPLE OF WHAT HIGHER M-R-S POWER AND CAPACITY CAN MEAN TO YOU

Haul: 2000 ft. One-Way	Two-Axle Unit A 18 c.y. struck	Three-Axle Unit B 18 c.y. struck	M-R-S 250 and 34 c.y. struck OS-300-B Scraper
Number of trips timed	5	9	18
Complete cycle-minutes	8.9	8	6.87
Trips per 50-minute hour	5.6	6.25	7.28
Production per 50-minute hour @ 80% struck capacity-c.y.	81	90	198
Gross income @ 25c per c.y. (1)	$20.25	$22.50	$49.50
Less estimated operating cost (2)	$13.62	$13.62	$22.52
Estimated gross profit per hour	$ 6.63	$ 8.88	$26.98
Production ratio	100%	111%	244%
Estimated Gross profit ratio	100%	134%	407%
M-R-S EXTRA PROFIT—10,000 hours			
Over two-axle Unit A	$203,500		
Over three-axle Unit B		$181,000	

(1) Price of dirt per c.y. used for comparative purposes only and is not meant to reflect cost of pusher, equipment on fill, overhead, etc.
(2) Estimated Ownership and Operating Costs figured by method widely accepted by industry.

have!

GREATER HAULING CAPACITY

Since M-R-S Tractors are not required to support the weight of the heavy scraper and payload at high speeds, they have the mechanical advantage of **towing** the load rather than having to **carry** it. This gives **greater capacity per horsepower, greater production per unit, less operating cost to charge to each yard of dirt moved.**

GREATER SELF-LOADING CAPACITY

With self-loading ability equal to that of crawler tractors of comparable static weight, M-R-S Tractors with their matching scrapers are by far the most practical self-loading rubber-tired equipment. From the 210 horsepower M-R-S 125 with self-loading capacity of 10 c.y struck* to the big 500 horsepower M-R-S 250 with self-loading capacity of 20 c.y struck*, **M-R-S has the proper size equipment to meet every self-loading need.**

*Even greater self-loading capacity in coal and other similar stockpiled materials.

FASTER USABLE SPEEDS

The weight distribution and balance of the four wheel M-R-S Tractor provides exceptional operator comfort even at high speeds, encouraging him to use the faster and more economical gears. M-R-S Tractors provide hauling speeds as high as 34.9 M.P.H.

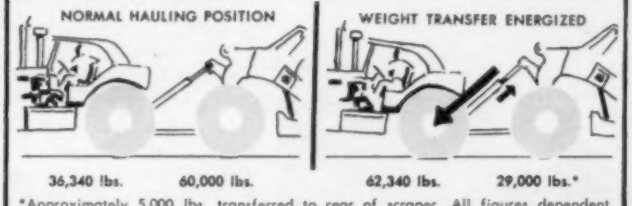
STRAIGHT LINE POWER TRAIN DESIGN

The simple M-R-S straight line power train design, combining the most rugged tried and proven components, efficiently transmits the engine horsepower to the drive tires with minimum friction and wear, resulting in lower maintenance cost and easier accessibility when maintenance is required.

EXCLUSIVE M-R-S WEIGHT TRANSFER SUPPLIES UNMATCHED TRACTIVE EFFORT

To assist the push tractor or to self-load, the operator can secure maximum traction by energizing the M-R-S Hydraulic Weight Transfer feature. This shifts part of the scraper weight to the low pressure tractor drive tires to secure approximately 60% greater ground contact area and up to 37% greater tractive ability. The M-R-S maximum tractive ability is equal to or greater than any prime mover of comparable weight or power. Extra drawbar effort to start and finish heaping push-loads or self-loads in economical time and distance.

After loading, the weight transfer is automatically disengaged, allowing the tractor-scraper weight to be distributed over four axles and the drive tires to return to normal for economical high-speed on or off-highway hauling. For negotiating extra soft surfaces or intense grades the operator can energize the weight transfer to vary the drive axle load for additional traction if needed. NOTE THE ILLUSTRATION OF WEIGHT TRANSFER IN ACTION BELOW:

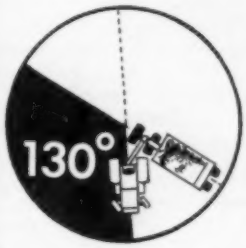


*Approximately 5,000 lbs. transferred to rear of scraper. All figures dependent on scraper weight and weight of material.

GREATER FLOTATION

The weight of the M-R-S Tractor and scraper is divided over four axles instead of two or three to hold axle loadings down to a practical minimum. This gives for better flotation for negotiating spongy haul roads and fills and substantially reduces haul road maintenance costs.

All M-R-S Tractors and the larger matching Wooldridge—M-R-S Scrapers have the new wide base tires as standard equipment, further increasing the flotation characteristics of the combination for more profitable operation under unfavorable conditions.



SHORTER NON-STOP TURNS

The exclusive "towing type" design of M-R-S equipment with hydraulic power steering and positive turning brakes permits M-R-S Tractors to turn up to 130 degrees in relation to the scraper. This means practical non-stop 180° turns in smaller confining areas — superior maneuverability for working even the biggest equipment in narrow cuts and fills.

AN M-R-S TRACTOR FOR EVERY POWER NEED

Tractor Model	H.P.	Self-Load (c.y. struck)	Push-Load (c.y. struck)
250	500	20	34
200	335	18	30
190	288	14	25
150	250	12	20
125	210	10	17

A WOOLDRIDGE—M-R-S SCRAPER FOR EVERY CAPACITY

Scraper Model	Struck, C.Y.	Heaped, C.Y.
OS-300-B	34.0	41.0
OS-260-B	26.0	32.5
OS-200-B	20.0	26.0
OS-152-B	15.1	18.0
OS-90-B	12.2	15.0
OS-80-B	8.0	10.5

THE EMBLEM OF DEPENDABILITY

M-R-S MANUFACTURING COMPANY

FLORA, MISSISSIPPI

New Equipment . . .

Continued from page 56

dozer weight for better traction and improved handling in ripping, push-loading or bulldozing operations.

Curved ripper shanks equipped with replaceable rock-splitting points produce an underground "quivering" action that seeks out cracks and weak spots, then shatters rock to easy-loading condition. The weight of tractor, plus ripper, is applied to the points by positive hydraulic control. Depth-adjustable

shanks are mounted on trailing swivel brackets which pivot on turns.

Maximum ripping depth is 26 inches with standard ripper shank and 30 inches and up with special shank. Subsoiler shanks for 32, 36 or 48-in. subsoiling depths and special root knives for land clearing and tree felling also are available.

Hercules Dump Line

Manufacturer: Hercules Steel Products Co., Division of Hercules Galion Products, Inc., Galion, Ohio.

Claims: Hercules announces the manufacture of a new series of single and tandem axle trailer dumps and four-wheel trailers with payload capacities of up to 30 cubic yards.

Equipped with front-mounted single-cylinder telescopic hoists, the new units are designed for over-the-road hauling of aggregates and other bulk materials. The dumps are suitable for use with either single or tandem axle tractors.

Front mounting of the hoist shifts hoist weight forward onto the tractor axles.

Lifting capacities of up to 35 tons are provided by a single 5-sleeve, 8-inch telescopic hoist front-mounted on 17 to 24 ft. single and tandem axle trailer dumps. Similar capacities are afforded by a 4-sleeve, 7-in. front telescopic

hoist offered on 17 ft. single axle trailer dumps and full trailers.

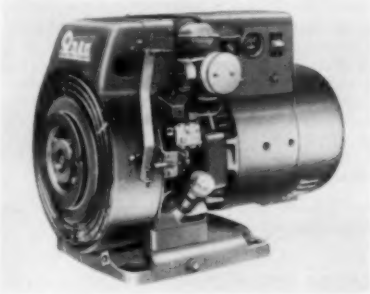
Standard equipment includes 7-in. air brakes, 10:00x20 tires, landing gear, ICC lights, directional signals and mud flaps.

Electric Generating Plant

Manufacturer: D. W. Onan & Sons Inc., Minneapolis 14, Minn.

Claims: Onan has announced the production of the Model 2LK, a heavy-duty electric generating plant which produces 2,000 watts, 60-cycle, alternating current at 1,800 rpm (or 1,500 watts in 50-cycle) in all standard frequencies and phases.

The Model 2LK is powered by an Onan single-cylinder, air-cooled, four-cycle gasoline engine with Stellite-faced rotating exhaust valve, large long-wearing bearings and air-cooling. A con-



servatively rated, blower-cooled Onan generator is direct-connected to the engine for permanent alignment.

Completely self-contained manual starting models are equipped with patented recoil rope starter, mounted fuel tank, muffler, air-cleaner, terminal box and vibration dampeners. Electrically-cranked remote starting models come

"Guess who?"

equipped with mounted control box, exhaust tubing and muffler, air-cleaner, separate fuel tank and battery cables.

The line of optional accessories includes: carrying frames, two-wheel dollies, automatic controls, emergency line transfer controls, receptacle plate kit and gas-gasoline carburetors.

Truck Mufflers

Manufacturer: Harflo Products, Ardsley, Pa.

Claims: A new line of heavy-duty, stack-type mufflers for diesel trucks is being produced by Harflo. The mufflers offer a minimum of back pressure combined with a tone control lower than those specified by the Society of Automotive Engineers.

The units are equipped with two baffles and an interrupted, perforated pipe in the sound chamber. Construction is 16-gauge steel throughout, with the long seam continuously welded, and heads, baffles and tubes electric arc welded. Mufflers are finished in a special, dapple gray enameloid. Extensions, reducers and clamps are available to solve all special fitting problems.

Carbide Cutting Blanks

Manufacturer: Carboloy Dept. of General Electric Co., Detroit, Mich.

Claims: A line of carbide stone cutting blanks specifically designed for tipping stone cutting tools used in quarries, stone sheds and monument works, among other places, for cutting granite, marble slate, sand and limestone, has been announced by the Carboloy Dept.

The carbide blanks will be made in a wide variety of standard sizes and

Contrast this early model Rogers Trailer hauling a 6 ton transformer over mountainous roads with a present day model equipped with the remarkable quick, detachable gooseneck.

The contrast graphically illustrates the vast improvements that have been made in the large and diversified line of

ROGERS TRAILERS

Operators of low bed trailers will do well to thoroughly investigate Rogers Trailers and make comparisons with others as to design, construction and operating features.

There are general purpose trailers for handling many types of loads. Others are especially suited for moving caterpillar mounted cranes. Another trails along behind a dump truck, doubling its usefulness. Tilt deck trailers handle certain jobs especially well, and pole trailers aid the conventional trailers in handling long loads, such as stacks, tanks, processing equipment.

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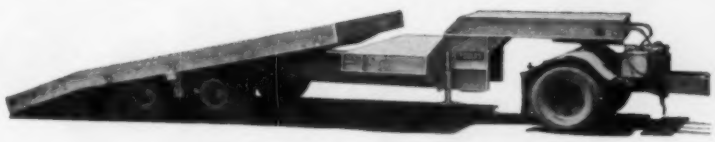


Divided bed, tilt deck trailer with gooseneck

shapes. Those styles which generally fit into a slot or a milled recess will be manufactured with negative tolerances. This feature, according to Carboloy, enables such tools to be machined with a standard width milling cutter or slotting saw so that the blanks will be of correct thickness for the proper braze.

Other stone cutting blanks of non-standard carbide grades, shapes or sizes will be made to order.

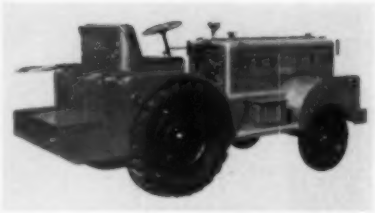
New-Design Weldmobile

Manufacturer: Hobart Bros. Co., Hobart Square, Troy, Ohio.

Claims: Hobart has a completely new design for its Weldmobile. The Weldmobile is a self-contained, self-propelled welding unit. The engine is directly coupled to the generator.

The Weldmobile is designed to provide a mobile self-propelled welding unit for installations in which welding applications occur at widely separated points. Its towing capacity is rated at 2,000 pounds draw-bar pull.

The 400-amp model is powered by a Chrysler 6-cylinder industrial engine. The 600-amp model is powered by a



Chrysler V8-cylinder industrial engine. In addition to welding power, the Weldmobile can supply up to 1 KW (110 volts DC) auxiliary power.

Two wells and brackets are located at the rear for acetylene and oxygen tanks. Welding, traveling and power controls are centrally located in front of the driver's seat on a special dashboard.

Wire Rope Straightener

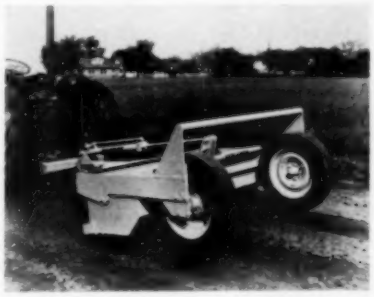
Manufacturer: Cable Strate Co., 345 Arbor Rd., Menlo Park, Calif.

Claims: Cable Strate is producing a wire rope straightener. The portable machine can be operated by one man. The tool is available in two sizes (Medium and Universal) and four models. The medium size is for ½ to 1-in. cable. Model MC has a 20-lb. cast-iron base; Model MA has a 9-lb. aluminum alloy base. The universal size is for ¼ to 1½-in. cable. Model UC has a 30-lb. cast iron base; Model UA has a 12-lb. aluminum alloy base.

Shawnee Utility Scraper

Manufacturer: Shawnee Mfg. Co., 1947 N. Topeka Ave., Topeka, Kan.

Claims: The availability of a new two-wheel hydraulic scraper is announced by Shawnee. The scraper has been tested and approved by the International Harvester Co. for mounting on its "300" utility tractor.



The scraper has a capacity of ⅛ yard. It is hydraulically controlled from the driver's seat. The 66-in. wide cutting blade extends beyond the wheels and sides of the scraper.

The new scraper is suited for digging small excavations, leveling, building small roadways, cutting drainage ditches and general clean-up work. The unit has two 6:00x15 tires. It weighs approximately 900 pounds.

Motor Powered Wheelbarrow

Manufacturer: United Sales Co., Staten Island, N. Y.

Claims: An all new power wheelbarrow called the "Lightning Bug" has been introduced, according to the manufacturer.

Two sizes are available. The junior size is powered by a 2-hp gasoline engine and the senior size is powered by a 4-hp gasoline engine.

Features include a self-tipping tray that is controlled by the operator. Throttle control is also at the operator's fingertips. Both units are capable of carrying their full capacity up a 25° incline.

The "Lightning Bug" can be used for carrying dirt, rock, cement, and all other bulk material. It can also be had with a flat pallet for carrying cinder block, brick and insulation.

BUILT FOR THE JOB!
Omaha Dragline Buckets are built to do the job better, faster. All unnecessary weight has been eliminated. A higher arch gives more clearance for digging and dumping . . . makes room for a bigger load. Available in four types. Write today for complete catalog with description and specifications.
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DRAKE-WILLIAMS MOUNT • OMAHA, NEBR.

New Trade Literature

Subject: **Caterpillar Quality**
Content: *Let's Talk Nuts and Bolts* is the title of an 8-page booklet which describes quality controls used in the manufacture of Caterpillar track hardware—bolts, nuts, capscrews and lockwashers. The booklet discusses the advantages obtained through quality materials, heat-treating and careful inspection. French, Portuguese and Spanish translations are available.
Where to get: Caterpillar Tractor Co., Peoria, Ill., or Caterpillar dealers.

Subject: **Cleveland Trencher**
Content: A quick, convenient comparison of the capacities, specifications and dimensions of the Cleveland line of six trencher models and two backfiller models is offered in a 4-page bulletin. The text enumerates design and construction features incorporated in each model. Job photos show the units at work on all kinds of trenching projects. Revised specifications for the Model 80W backfiller are listed. Ask for bulletin S-120.
Where to get: Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland 17, Ohio.

Subject: **Malsbary Steam Cleaners**
Content: A 4-page catalog illustrates the eight basic models in the Malsbary steam cleaner line. The text suggests where each model fits best and contains an easy-to-read listing of cleaning actions, pressures, temperatures and capacities. Ask for catalog 156.
Where to get: Malsbary Mfg. Co., 845 92nd Ave., Oakland 3, Calif.

Subject: **Hyster Grid Roller**
Content: Advantages of the Hyster Grid Roller for embankment compaction, crushing and compacting pit run rock for surface or base courses and salvaging deteriorated bituminous road surfaces are explained in two booklets. Job data describes how a California county reclaimed material in 1½ miles of bituminous road. Another report describes use of the Grid Roller in crushing limestone rock to 2-in. minus. Included in the booklets are job photographs and specifications. Ask for booklets 1374 and 1375.
Where to get: Hyster Co., 1800 N. Adams St., Peoria 1, Ill., and 2902 N. E. Clackamas St., Portland 8, Ore., or from Caterpillar — Hyster distributors.

Subject: **Hard Surfacing Alloys**
Content: The Coast Metals' newly developed line of hardsurfacing alloys is described in a brochure containing a series of specification sheets. The hardsurfacing materials consist of alloy-filled tubes, either in coils for automatic welding or cut to length for manual application.
Where to get: Coast Metals, Inc., Little Ferry, N. J.

Subject: **Four-Wheel Drive Units**
Content: Two pamphlets describe Napco's Powr-Pak four-wheel drive units for use with General Motors and Chevrolet trucks. The units are sold, installed and serviced by GMC and Chevrolet dealers to convert 2-wheel drive into 4-wheel drive trucks.
Where to get: Napco Products Div., Napco Industries, Inc., Minneapolis 11, Minn., and GMC or Chevrolet dealers.

Subject: **Laughlin Fittings**
Content: An illustrated 28-page catalog provides engineering data on the Laughlin line of fittings for wire rope and chain. Charts list dimensions and safety factors for links, rings, shackles, swivels, hooks, turnbuckles, thimbles, clips, sockets, ring bolts, eyes and load binders. Ask for catalog 950-1.
Where to get: The Thomas Laughlin Div., American Hoist & Derrick Co., Portland, Me., or American Hoist & Derrick Co., St. Paul 1, Minn.

Subject: **Rubber Products**
Content: B. F. Goodrich has issued three bulletins. Servicing, repair and advantages of tubeless truck tires are discussed in a 12-page booklet, *All You Need To Know About Tubeless Tires for Trucks.* How to mount, demount and repair tubeless truck tires is explained. Another Goodrich bulletin describes care and maintenance

STURDILITE
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Write for Illustrated Bulletin.

nance of industrial V-belts. The 14-page illustrated manual covers the following topics: designing the new drive; double matching; installation of belts; how V belts grip; importance of tension; drive alignment; how to clean; and storage. The third bulletin is a 12-page illustrated catalog on the Goodrich line of protective industrial clothing. Koroseal rainsuits, hats, aprons and gloves are described.

Where to get: B. F. Goodrich Co., Akron, Ohio.

Subject: **Belt Conveyor Carrier**

Content: A 16-page bulletin illustrates and lists specifications for the complete line of belt-conveyor carrier units, including a new long-center roll carrier with 35° to 45° slope-end rolls for greater carrying capacity on light materials. The bulletin also describes a number of special carrier units, as well as belt conveyor trippers and accessories. Ask for bulletin 355.

Where to get: Stephens-Adamson Mfg. Co., Aurora, Ill.; Los Angeles, Calif.; Belleville, Ont.

Subject: **Road Machinery**

Content: A trio of new heavy road building machines is described in a catalog available from the export department of the Blaw-Knox Co. The new machines are the road widener, the trench roller and the base paver. The road widener will handle earth, gravel, stone, asphaltic concrete, portland cement concrete or soil cement in high volume from a dump truck or truck mixer. The trench roller, companion piece to the road widener, is used to compact the excavated trench along side of the old pavement in widening work. The base paver is designed for laying base courses. Ask for catalog 2502; available in English, French, Spanish and Portuguese.

Where to get: Blaw-Knox Co., Export Dept., 405 Lexington Ave., New York 17, N. Y.

Subject: **Michigan Turbo-Dozer**

Content: More than 50 photographs illustrate the operation and correct application of the Michigan Model 180 Turbo-Dozer in a 20-page booklet offered by Clark Equipment Co. The text describes operational features of the rubber-tired unit powered by a turbocharged diesel engine. Engine, power train and hydraulic system specifications are listed. Ask for Turbo-Dozer bulletin 157.

Where to get: Clark Equipment Co., Construction Machinery Div., Box 599, Benton Harbor, Mich.

Subject: **Service Tool Manual**

Content: A 48-page General Motors truck special service tool manual contains information on Kent-Moore Rate-Maker special tools for factory-recommended service on GMC gasoline and diesel powered trucks. Prepared with the GMC truck service man in mind, the manual describes and illustrates hundreds of special service tools for servicing axles, brakes, clutches, transmissions, fuel systems, engines, steering mechanisms and other assemblies. Model application is specified for each tool. Model applications cover up to and including 1955.

Where to get: Kent-Moore Organization, Inc., 5-105 General Motors Bldg., Detroit 2, Mich.

Subject: **Drill Supplies**

Content: The Acker Drill Company's new 40-page *Drill Supplies Catalog* contains an up-to-date listing of all its drilling tools and supplies used for soil sampling and foundation test boring, among other things.

Where to get: Acker Drill Co., Inc., Scranton 3, Pa.

Subject: **Armco Drainage Products**

Content: A condensed, illustrated catalog presents products of Armco Drainage & Metal Products, Inc.: corrugated metal pipe and pipe-arch; Multi-Plate pipe; perforated pipe; bin-type retaining walls; tunnel liner plates; Steelox buildings; steel sheeting; Flex-Beam guardrail; corrugated metal sewer pipe; and water control gates.

Where to get: Armco Drainage & Metal Products, Inc., Middletown, Ohio.

Subject: **Facts and Figures**

Content: Pioneer's 11th *Facts and Figures* book is available. The 100-page pocket reference book has information for highway, heavy construction or other basic industries. The booklet includes, among other things, tables of weights and measures, decimal equivalents of fractions, trigonometric functions, thermometer scale conversion and definitions. The booklet is free.

Where to get: Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.

Subject: **Lessons in Arc Welding**

Content: A series of practical exercises and instructions for developing and improving the technique of arc welding operators. This 200-page book comprises the second part of the new and complete Hobart text book "Modern Arc Welding" and contains the complete series of 40 arc welding exercises as used at the company trade school. Lessons covered include: preliminary instruction, starting and manipulating the arc, welding common joints with bare electrodes, welding light gauge sheets with coated electrodes, general welding with coated electrodes in the flat, horizontal, vertical and overhead position, pipe

"I say, old bean, I do hope you'll replace the divots when you're through."

welding, welding cast iron, and special practices and tests. The book is priced at $1 per copy.

Where to get: Hobart Trade School, Inc., Hobart Square, Troy, Ohio.

Subject: **Examination Handbook**

Content: Candidates for engineering licenses will get an idea what the real examinations are like and what they need to know to pass them in *Professional Engineer's Examination Questions and Answers*, by William S. LaLonde, Jr. The 462-page book, which contains 215 illustrations, will be published in January by McGraw-Hill. A selection of more than 500 questions was taken from actual recent examinations for professional engineer license, land surveyor license and engineer-in-training certificate. A detailed answer for each question is given. The questions cover all major phases of professional engineering examinations. Questions concern fundamental engineering and chemical, civil, electrical and mechanical engineering. The author, a licensed professional engineer, is chairman of the Department of Civil Engineering at Newark College of Engineering. The price is $6.50.

Where to get: McGraw-Hill Book Information Service, 327 W. 41st St., New York 36, N. Y.

'Richest Hill' . . .

Continued from page 25

roads smooth for the heavy, high-capacity equipment. Several water trucks sprinkle haul roads.

One of the provisions about handling the copper ore is that F & S has to reduce it in size to minus eight inches. Here again, the company staffed up with modern overhead eccentric jaw crushing equipment. It purchased new a Pioneer 42 x 48 overhead-type jaw crusher and powered it with a 200-hp electric motor. The jaws of the crusher have the ability to hold a piece of ore and crowd it through, so that a piece of rock entering the crusher is pulled downward and through in a hurry. The crusher will easily handle up to 600 tons per hour without being overworked. After passing through the crusher, the ore passes on to the mill where the copper recovery process begins.

The large fleet of power-shovel and hauling equipment is turning in an exceptionally good performance. The 150-B will load out about 400 cubic yards per hour. The smaller machines are in proportion. Efficient hauling units have been placed under these rigs.

While abrasion and wear on dipper teeth and lips have been present, this has not been a real problem. A regular program of hardfacing with manganese plate and several types of hardfacing electric rod has kept the points from wearing excessively. Other maintenance is mostly routine on the electric-control mechanisms of the shovels and the 40-R drill.

Leaching Process

Details of the extraction of copper from the copper ore, together with the degree of copper enrichment, are Anaconda secrets. In any case, they do not affect excavation and drilling problems. But one of the more interesting sidelights of the copper recovery process is a leaching plant which The Anaconda Co. has placed in operation along the east side of the hill. The leaching operation is strictly subsidiary to the main recovery process, but it demonstrates the peculiar ability of copper to precipitate itself under certain conditions.

If ordinary water is passed through the copper-bearing ore, it comes out of the bottom of the pile with copper in solution. Repeated drops of this water falling on a cast-iron pipe will quickly wear a hole in the pipe because of the tendency of the copper to replace iron, tin or steel. The copper-laden water is trained down to leaching ponds where bales of tin cans and other metal are introduced into the solution. Pure copper is quickly precipitated to replace the iron and a sizable amount of the valuable metal is recovered by that method. In the old days when this characteristic of the copper water first was discovered, the company used worn-out railroad rails as a precipitant. Old and crippled miners swept the copper off the rails from time to time where it was recovered. Eventually the rails disappeared as the copper-laden water worked on the metal they contained.

Economy Hinges on 'Hill'

The Anaconda Company's Butte works represent one of the most significant mineral contributions in the United States at this time. Butte's economy and indeed the economy of much of the state of Montana hinges on the production of copper from mining reserves now known to exist under the richest hill on earth.

YOUR OPPORTUNITY!

UNUSED Army Trucks
2½, 3½, 5-ton

GMC-DIAMOND T & INTERNATIONAL 6x6's

- *From Government Storage!*
- *Unused and Guaranteed!*
- *Factory-New Condition!*
- *Delivered on Approval!*
- *Reconditioned Trucks Also Available!*

Tandem axle trucks with front wheel drive, 10 forward speeds, overdrive, brand-new mud and snow tires. Carry maximum loads, give extra power you need in "rough going" . . . at LESS, often half the COST of conventional new trucks.

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Sales Manager

MEMPHIS EQUIPMENT Company
CONSTRUCTION AND AUTOMOTIVE EQUIPMENT AND PARTS
766 SO. THIRD ST. MEMPHIS, TENNESSEE

A group of experienced mining veterans is directing all operations for The Anaconda Co. General supervision over all the works is under the direction of C. H. Steele, vice-president in charge of western operations. Steele's assistants include A. C. Bigley, manager of western operations; E. I. Renouard, manager of mines; and Edward P. Shea, head of the company's geology department.

F & S Has Veterans

The contractor's operations, too, are staffed by veterans. F & S Contracting Co. is represented by A. J. Anderson, general manager, with Louis Mohr as general superintendent and Tom Davies as general foreman in charge of excavation and drilling operations.

As the great power shovels eat their way down through the overburden into the orebody underneath and as geologists examine the samples brought up from deep underneath the ground surface by drilling equipment, they are obtaining an interesting bit of information. It means only one thing. The richest hill on earth was never richer, even when it was new. And Butte will be in the mining business for many years to come.

Flood Control . . .

Continued from page 35

by the 22-B transit crane, carrying a 1-yd. concrete bucket.

The Arcadia Wash project was begun on March 24, 1955, and is scheduled to be completed March 2, 1956. The waterway was to have been usable last November 1.

MacDonald & Kruse's Arcadia Wash Project is one of many similar projects which tie together the flood control program.

Gordon A. MacDonald and Harvey W. Kruse head MacDonald & Kruse, Inc. They met while on wartime construction work in the Los Angeles area. This, and later postwar meetings, led to the formation of the company, which was incorporated in 1946. MacDonald, a former U. S. Navy commander, was the construction officer during the war for the Bureau of Yards and Docks at the Terminal Island naval base. Kruse was a general superintendent for the Guy F. Atkinson and George Pollock firms on their Terminal Island projects.

MacDonald and Kruse personnel on the Arcadia Wash Project are Ed Ford, field engineer; Orrie Siler, master mechanic; Stan Belczak, excavation superintendent; Ray Cota, fine grade foreman; Casey Dombrowski, concrete superintendent, and Lee Thomson, carpenter superintendent. Bob Kruse is acting superintendent.

William S. Cowart is resident engineer on the project for the Corps of Engineers and Floyd Childs is office engineer. Clarence Grove, Paul Cranston and Frederick Warner are inspectors.

Pipeline . . .

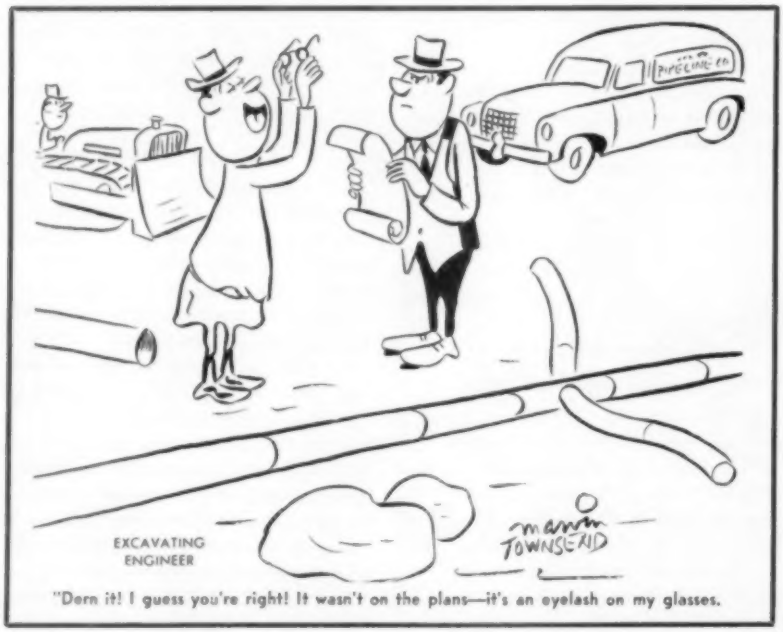
Continued from page 31

gar appeared quiet and cold under Canadian skies. A tall, slender radio tower overlooked the camp which was situated at the junction of Biggar's two main highways. Office trailers, family trailers and parts sheds were arranged in neat rows.

In the warmth and light of the office trailers, an air of quiet efficiency replaced the outdoor activity. Matt Rachal, master mechanic, and J. E. Lawson, company purchasing agent, were considering some parts needs. Walt Hill, office manager, was preparing time sheets at a corner desk. Plans and specifications sheets were piled neatly on another work table.

The job was rolling along at a steady pace. In spite of the rapidly moving operation there was no need for a feeling of urgency either in the office or out on the line.

In addition to those already mentioned, other men of experience whom Majestic's leaders secured to do the job were: Bill Chester, ditching foreman; Bam McCord, welding foreman; Troy Davis, in charge of the dope gang; and Chris Leier, utility winch foreman. Red Broome is chief inspector. Fish Engineering Co., Houston, Tex., is in charge of the pipeline program.



"Dern it! I guess you're right! It wasn't on the plans—it's an eyelash on my glasses.

Notes from the Manufacturers

American Brake Shoe Co., New York, N. Y., has announced plans for the formation of a company to manufacture precision ferrous castings in the United Kingdom. The new firm will be a joint venture of American Brake Shoe and F. H. Lloyd & Co., Ltd., of England. Plant operations are expected to begin toward the end of 1956. The company will produce castings for jet planes and tire molds. The parent company has also created an overseas operations department to handle expansion of its foreign activities through licensing arrangements and joint ownership of overseas operating companies. Bernard G. Drummond, formerly executive vice president of American Brake Shoe's Sintermet Div., is director of the new department.

Athey Products Corp., Peoria, Ill., has licensed Steelweld Pty. Ltd., West Footscray W., Victoria, Australia, to manufacture Athey products in Australia to Athey's specifications. Dollar shortages and import regulations were cited as reasons for the arrangement. Steelweld is the third manufacturer licensed by Athey. Others are Birtley Co., Ltd., in the United Kingdom, and Wright, Boag & Head, Wrightson (Pty.) Ltd., in South Africa.

Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio, has named J. V. Gunter as its southern district sales manager at Atlanta, Ga. He succeeds Fred L. Maus who joined a distributor organization at Fort Smith, Ark. Gunter will serve the states of Arkansas, Louisiana, Tennessee, Mississippi, Alabama, North Carolina, South Carolina, Georgia, Florida and parts of Virginia, Oklahoma and Missouri.

Blaw-Knox Co., Pittsburgh, Pa., has

announced several interim appointments for the firm's recently acquired Continental Foundry & Machine facilities. David Lyle has been appointed vice president, rolling mill engineering, of both Continental Foundry & Machine Div. and Lewis Machinery Div. A. E. Murton has been named vice president, roll sales, of both Continental Foundry & Machine Div. and Blaw-Knox Rolls Div. Dr. F. H. Allison, Jr., will serve as vice president, roll metallurgical research of Continental Foundry & Machine and Blaw-Knox Rolls divisions. Lyle, Murton and Allison all will make their headquarters in Pittsburgh.

Clark Equipment Co., Buchanan, Mich., has announced the formation of a new subsidiary to consolidate export functions of its operating divisions throughout the world. The new corporation, organized under the laws of Venezuela, will be known as Clark Equipment International, C. A. Domestic branch offices of the corporation will be established at Battle Creek and Benton Harbor, Mich. The new subsidiary is expected to promote new markets for materials handling industrial trucks, construction equipment and heavy automotive components manufactured by Clark. The firm also has appointed two new domestic distributors to handle its line of Michigan tractor shovels and excavator cranes. J. W. Burress Co., 100 Waughtown St., Winston-Salem, N. C., will handle Michigan products in North Carolina; Sheehan-Bartling, Inc., W. 12th St., Sioux Falls, S. D., will serve South Dakota.

Copco Eastern Ltd., New York City, has changed its name to Atlas Copco Eastern, Inc. Copco Eastern is a subsidiary of Aktiebolaget Atlas Diesel of Stockholm, international manufacturer of rock drills and other pneumatic equipment. The parent company also has changed its name to Atlas Copco Aktiebolag. The change was made to identify members of the Atlas group more closely with the pneumatic equipment field. Copco is an abbreviation of Compagnie Pneumatique Commerciale, the original name of Atlas Diesel's Belgian subsidiary.

Detroit Diesel Engine Div., General Motors Corp., Detroit, Mich., has announced the appointment of T. L. Guarniere as merchandising manager. Guarniere joined Detroit Diesel in 1943 as a field service representative. He later became director of service training and established the division's factory training school for distributors, owners and operators of diesel engines. Prior to his present appointment, Guarniere was sales promotion manager. He now heads the manufacturer's advertising, sales promotion and publicity activities. Detroit Diesel has also appointed two new distributors. Gil Boers Equipment Co., 7739 S. Kedzie St., Chicago, Ill., will handle sales and service for both industrial and marine engines in northern Illinois and the counties of Lake Porter, La Porte and St. Joseph in the state of Indiana. Hubbs Engine Co., 9 Commercial Ave., Cambridge, Mass., will handle Detroit Diesel marine engines in the states of Massachusetts, Rhode Island, Maine, New Hampshire and part of Connecticut and industrial engines in Massachusetts, Rhode Island and part of New Hampshire.

Drake-Williams-Mount Co., Omaha, Neb., has announced the retirement for health reasons of its president, Walter H. Williams, after 50 years of service. Williams is widely known as a designer and fabricator of heavy construction equipment and structural steel. Named to succeed Williams was his son, Arthur W., who formerly was vice president.

Euclid Div., General Motors Corp., Cleveland, Ohio has announced the retirement of Paul H. Malenchini, export sales manager. Malenchini joined Euclid in 1940 and established its export sales organization. Foreign sales represent one-fourth of Euclid's total sales volume.

Galion Allsteel Body Co., Galion, Ohio, has named Maday Body Works, Buffalo, N. Y., to distribute Galion dump bodies, hydraulic hoists, LOAD-evator hydraulic and electric endgates in western New York. The Maday firm is equipped with complete body mounting and repair facilities.

Hensley Equipment Co., Inc., San Leandro, Calif., has added to its dealer organization seven firms who will handle the Hensley line of dozer and scraper rippers, cutting edges, bottom

In a Hayward, there's no contact between the closing mechanism and the gravel or other materials handled. To be sure—this "no contact" feature is only one advantage. But a very important one to you—since it means much less wear, reduced upkeep, and a significant dollar-saving in bucket maintenance.

The Hayward Company, 50 Church St., New York 7, N.Y.

HAYWARD BUCKETS

CLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLES

famous for performance since 1888

track rollers and allied tractor replacement parts. The appointees are: Contractors Equipment & Supply Co., Fresno, Calif.; R. A. Young & Son, Tulsa, Okla.; W. L. Johnson Machinery Co., Midland, Tex.; Doug-Lynn Manufacturing & Machinery Co., Santa Rosa, Calif.; Wenzel Machinery Rental & Sales, Kansas City, Kan.; Complete Industrial Supply Co., Phoenix, Ariz., and Columbia Equipment Ltd., Vancouver, B. C.

Hercules Powder Co., Wilmington, Del., has announced the retirement of John T. Moore, explosives department safety manager. A veteran of 40 years of service, Moore is an authority on explosives safety engineering, including the fields of smokeless and black powders and high explosives. Lewis W. Greiner, assistant safety manager, succeeds Moore. Greiner will be responsible for safety and fire protection in operations at Hercules explosives plants and ordnance plants operated by Hercules for the U. S. government and will serve as a consultant on safety in the storage and transportation of explosives.

The Frank G. Hough Co., Libertyville, Ill., has announced the appointment of new distributors and the assignment of additional territory to some of its present distributors. Authorized to handle sales, service and

parts on Payloader tractor-shovels and tractors are Phillippi Equipment Co. for the state of Minnesota, with headquarters in Minneapolis and branches in Duluth, Hibbing and Moorehead; Rish Equipment Co. for the state of Ohio, with plants in Cleveland, Columbus, Dayton, Toledo, Cincinnati and Portsmouth; J. D. Evans Equipment Co., Sioux Falls and Rapid City, for the state of South Dakota; and State Equipment Co., Montpelier, for the state of Vermont. Brandeis Machinery & Supply Corp., Mt. Vernon, has added territory in southern Illinois.

Huber-Warco Co., Marion, Ohio, has named John (Jack) McCaffrey, Pleasanthill, Calif., as sales representative on the west coast for its line of graders, tandem rollers, and three-wheel rollers. His sales territory includes Idaho, Utah, Montana, Washington, Oregon, California and Arizona; the Canadian provinces of Alberta and British Columbia; and Alaska. McCaffrey has a broad background in sales and in industry. Most recently he served as East Bay district sales manager for Western Traction Co., San Francisco, Calif. Previously, he was a contractor's representative at Chicago Pneumatic's branch office in San Francisco. He also was associated with the Henry J. Kaiser Co. shipyards, Richmond, Calif., and Judson Steel Corp., Emeryville, Calif.

International Harvester Co., Motor Truck Div., Chicago, Ill., has appointed Duane F. Kuntz as assistant manager of motor truck sales. Kuntz previously was manager of the firm's southwest motor truck sales region. International also has named Sal Colacuori as sales supervisor, motor truck development. Colacuori formerly was general supervisor of motor truck sales engineering. He will coordinate activities of International's advanced engineering, market research and sales engineering groups in the development of new product design for trucks.

Le Roi Div., Westinghouse Air Brake Co., Milwaukee, Wis., has made several appointments in its sales and service departments. William F. Briney has been named manager of construction industry sales; Edward R. Couch, manager of stationary compressor sales; and Paul Azzolina, service manager. Briney is responsible for sales of portable air compressors, Tractairs, rock drills, and other Le Roi products used by the construction industry. He recently was sales manager for a large west coast heavy machinery distributor. He has been a sales engineer and a district representative for Le Roi. Couch's new duties include sales planning and development of distributor sales and service programs. He formerly was an assistant product sales manager. Azzolina will supervise field servicing of all Le Roi products, maintenance of the parts department and publication of service bulletins and parts catalogs. He has been assistant service department manager.

Marion Power Shovel Co., Marion, Ohio, has announced the promotion of three men in its sales organization in the southwestern states. Dean Calland, formerly district manager at San Francisco, is now western sales manager. His headquarters are at 326 Shaw Rd., South San Francisco, Calif. Named as divisional sales managers to assist Calland were T. R. Fogelberg, 4835 Crenshaw Blvd., Los Angeles, and E. J. Riggs, 1017 N. 22nd St., Phoenix, Ariz. Fogelberg will cover counties in southern California. Riggs will serve the states of Arizona and Utah and also parts of Idaho, Nevada, Wyoming and New Mexico.

Napco Industries, Inc., Minneapolis, Minn., has appointed Robert L. Wicker as sales manager for its Federal Motor Truck Div. Wicker formerly was general sales manager for Dart Truck Co., Kansas City, Mo. He will be in charge of sales of Federal crane carriers, four-by-fours, six-by-sixes, transit mixer carriers and other specialized transport machinery built with "on-highway" axles. Federal designs and builds custom-tailored machinery for all phases of the mining, logging and construction industries.

"Woodman, spare that tree! Touch not a single bough . . ."

TO ADVERTISE: All advertising in this section is payable in advance. Rate: $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

SHOVELS DRAGLINES
DRILLS TRACTORS
TRUCKS

190-B Bucyrus-Erie electric 8 yd. shovel;
170-B Bucyrus-Erie electric Hi-lift 5 yd. shovel;
1600 P&H 6 yd. electric shovel;
2400 Lima 6 yd. diesel shovel;
2400 Lima 4 yd. Hi-lift shovel;
120-B Bucyrus-Erie electric 5 yd. shovel;
1400 P&H 4 yd. electric shovel;
111-M Marion 3½ yd. diesel shovel;
4161 Marion 5 yd. electric shovel, worked about three years;
1201 Lima 3½ yd. diesel shovel;
1201 Lima Hi-lift diesel shovel 42' boom, 32' stick, 2½ yd. dipper;
1201 Lima semi-hi-lift diesel shovel, 36' boom, 27' stick, 3 yd. dipper;
3500 Manitowoc Hi-Lift diesel shovel 45' boom, 35' stick, 2 yd. dipper;
111-M Marion Hi-lift diesel shovel 43' boom, 23' stick, 3 yd. dipper;
40-A Marion Hi-lift diesel shovel 45' boom, 34' stick, 2½ yd. dipper;
450-W Bucyrus-Erie diesel dragline 165' boom, 13 yd. bucket;
625 Page diesel dragline 150' boom, 9 yd. bucket;
5-W Bucyrus-Erie diesel dragline 125' boom, 5 yd. bucket;
2400 Lima diesel dragline 130' boom, 5 yd. bucket;
4500 Manitowoc diesel dragline 120' boom, 5 yd. bucket;
1055 P&H diesel dragline 80' boom, 4 yd. bucket;
1201 Lima diesel dragline 85' boom, 3 yd. bucket, Independent boom hoist;
3500 Manitowoc diesel dragline 85' boom, 2½ yd. bucket;
600 Reich heavy truck mounted rotary air drill;
50-R Bucyrus-Erie blast hole drill—drills up to 12" hole;
Quarrymaster drill with 2—500 cu. ft. compressors;
58-BH Joy Champion rotary air drill;
56-BH Joy Middle weight rotary air drill; also 42-T, 29-T and 27-T well drills.

Many Good Used Trucks

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa.
Phone GLadstone 5-3658

Bucyrus-Erie 375-B dragline with 150 foot boom and 10 cubic yard bucket; shipped 1930; location Illinois. Address Purchasing Agent, Truax-Traer Coal Company, 111 North Wabash Avenue, Chicago 2, Ill.

Marion 360-M dragline with 150 foot boom and 10 cubic yard bucket; shipped 1928; location Illinois. Address Purchasing Agent, Truax-Traer Coal Company, 111 North Wabash Avenue, Chicago 2, Illinois.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

SHOVELS DRAGLINES
DRILLS TRACTORS
TRUCKS

170-B Bucyrus-Erie electric 6½ yd. shovel.
1600 P&H 6 yd. electric shovel.
2400 Lima 6 yd. diesel shovel.
2400 Lima 4 yd. Hi-Lift shovel.
120-B Bucyrus-Erie electric 5 yd. shovel.
1400 P&H 4 yd. electric shovel.
111-M Marion 3½ yd. diesel shovel.
4161 Marion 5 yd. electric shovel; worked about three years.
1201 Lima 3½ yd. diesel shovel.
955 P&H 2½ yd. diesel shovel.
1201 Lima Hi-Lift Diesel shovel 42' boom, 32' stick, 2½ yd. dipper.
1201 Semi-Hi-Lift diesel shovel, 36' boom, 27' stick, 2 yd. dipper.
3500 Manitowoc Hi-Lift diesel shovel, 45' boom, 35' stick, 2 yd. dipper.
111-M Marion Hi-Lift diesel shovel, 43' boom, 23' stick, 3 yd. dipper.
40-A Marion Hi-Lift diesel shovel, 45' boom, 34' stick, 2½ yd. dipper.
9W B-E electric dragline 200' boom, 8 yd.
7400 Marion electric dragline 200' boom, 8 yd.
625 Page diesel dragline 150' boom, 9 yd. bucket.
5-W Bucyrus-Erie diesel dragline 125' boom, 5 yd. bucket.
2400 Lima diesel dragline 130' boom, 5 yd. bucket.
4500 Manitowoc diesel dragline 120' boom, 5 yd. bucket.
1055 P&H diesel dragline 80' boom, 4 yd. bucket.
1201 Lima diesel dragline 85' boom, 3 yd. bucket; independent boom hoist.
3500 Manitowoc diesel dragline 85' boom, 2½ yd. bucket.
600 Reich heavy truck mounted rotary drill.
Quarrymaster drill with 2—500 cu. ft. compressors.
58-BH Joy Champion Rotary Air Drill.
56-BH Joy Middleweight Rotary Air Drill; also 42-T, 29-T and 27-T well drills.

Euclid Trucks—Many to Choose From

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

2400 Hi Lift—4500 Manitowoc

Lima 2400—67' boom—50' stick; 4 yd. dipper—Caterpillar diesel; 9000 hours total service.

4500 Manitowoc—120' boom—5 yd. bucket Caterpillar diesel.

Reich 600 Rotary Air Drill on truck.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazelton Nat'l Bank Bldg.
Hazleton, Pa. Phone: GLadstone 5-3658

Bucyrus Monighan 6160 electric dragline and Bucyrus Erie 50-B electric horizontal thrust coal loader; trail cables included; Price of dragline: $175,000; coal loader: $25,000; f.o.b. mine southeast of Clay City, Indiana. North American Mining Co., Clay City, Indiana.

Lima 2400 dragline equipped with 110' boom, two 7-yard Hendrix HS buckets, one 6-yard ESCO bucket, Kohler light plant; machine powered with Caterpillar D-397 diesel engine; 63" wide treads; long caterpillar frames; machine shipped September 1950; completely overhauled June 1955; engine completely overhauled April 1955; Approximately $5000 in spare parts available; Price, as is where is, $115,000. Box 3677

Bucyrus-Erie 200-W diesel dragline shipped in 1950; 125 ft. boom, 6 yd. heavy duty and 7 yd. light weight buckets. Some spare parts included. Good mechanical condition. Location Melbourne, Australia. Box 3682.

200-W Bucyrus-Erie walking dragline diesel powered, 125' boom—5 cu. yd.; type AX bucket; excellent condition; used only for about 18 months; machine delivered new April, 1952; located middle west. For further information address. Box 3683

Bucyrus-Erie 120-B shovel serial no. 37106 with two 5 yard dippers and spare long handle with 4 yard dipper; also includes about 2,000 feet power cable and a considerable quantity repair parts; good working condition; location State of Washington; price: $87,500. L. E. Dixon Company, 409 South California, San Gabriel, California.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie 15-B dragshovel powered by Buda gasoline engine with electric starter, 20" caterpillar treads, ½ yd. dragshovel bucket; machine serial no. 23325.

Model 34 Lima combination ¾ yd. dragline and clamshell with fairleads and tagline less buckets; powered by Buda gasoline engine with electric starter, 35' boom; machine reconditioned in good shape; serial no. 896.

Lorain model TL-25-K ¾ yd. dragshovel, wide cats, powered by General Motors 271 diesel with electric starter, machine used only 6 mos.; excellent buy.

General model 320 dragshovel ¾ yd., 36" bucket, 25" long wide cats, powered by General Motors 371 diesel with electric starter; machine new in March, 1953; a good buy.

Link-Belt LS-85, ¾ yd. dragshovel, wide cats, 36" bucket, Buda gasoline engine, electric starter; machine used approximately 1½ yrs.

General model 307, ¾ yd. clamshell, 40' boom, Hercules gasoline engine with electric starter. S. M. Christhilf & Son, Inc., 134 West Mt. Royal Ave., Baltimore 1, Maryland. Phone: LExington 9-4313.

One ¾ yd. model 45 Bay City backhoe attachment.

One ½ yd. Universal shovel and crane boom and ½ yd. clam bucket.

One ¾ yd. clam bucket.

Two-axle lowboy trailer, 25-ton capacity.

One yard Osgood shovel.

Sand pump 10"x8" SRL, C; complete with 6-cyl. GMC diesel with 680 ft. manganese pipe.

One Cleveland trencher, digs 5½ ft. deep.

One Corley saw mill complete.

WALTER RUPP
Marshallville, Ohio

Model H-2 Hydrocrane, serial #1354, with boom extension, bucket and tagline, mounted on Chevrolet truck; machine is in good operating condition. Price: $2000. Ohio Drilling Co., Massillon, Ohio.

MISCELLANEOUS EQUIPMENT

I-R Quarrymaster Drill

Two—500' Compressors, 40' steel—6" hole; about one year service; practically like new.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. Phone: GLadstone 5-3658

MISCELLANEOUS EQUIPMENT

Bucyrus-Erie Model 22-B, ¾ yd. shovel, with Caterpillar D-318 Diesel engine. Good condition. Can be seen at Waite yard.

Link Belt Model LS-90, 1 yd. shovel with Waukesha gas engine. Excellent condition, less than three years old. Very good buy. Waite yard.

Gradall—Model 2460, mounted on K-8 International truck chassis. 36" digging bucket. Very good condition; repacked and repainted. Waite yard.

Quickway—Model E Clamshell—Dragline Combination, mounted on Oshkosh 4-wheel drive truck carrier. Both truck and upper assembly overhauled less than 200 hours ago. Priced right. Located in Milwaukee; call for appointment to inspect.

Quickway—Model J back hoe—Shovel Combination. Very good condition. Priced to sell. Waite yard.

Michigan T-6-D rubber mounted shovel. Good condition. Priced right. Waite yard.

Lorain—Model 75, 1 yd. shovel. Old but good—a real rock shovel. Priced right.

H-3 Hydrocrane, mounted on L-162 International truck chassis—equipped with operator's cab, hydraulic tagline reel, clamshell. Very good condition. Waite yard.

H-2 Hydrocrane with clamshell bucket, tagline reel; as is, or rebuilt. Priced right. Waite yard.

Insley—Model 12, ¾ yd. back hoe; good condition; call for appointment to inspect.

Schield Bantam—Model 49 back hoe, mounted on tandem axle truck with 6-wheel drive. Good working condition—a bargain. Waite yard.

TD-6 International dozer-loader combination; very good condition. Priced to sell. Waite yard.

Caterpillar D-6 Bulldozer, Diesel power, narrow gauge; excellent condition; priced to sell quick. Call for appointment to inspect.

Caterpillar D-4 Bulldozer, wide gauge hydraulic blade, new street plates, current series model; perfect condition; priced right. Call for appointment to inspect.

Parson Trench Machine Model 25, equipped with full crawlers, Waukesha engine; perfect water pipe machine; excellent condition; approximately ¼ of today's cost. Call for appointment to inspect.

Paige RC Automatic Dragline Bucket, 1¼ yd. capacity; very good condition; priced for quick sale.

J. P. WAITE CONSTRUCTION CO.
3308 West Pierce St. Milwaukee 15, Wis.
Phone EVergreen 4-1900.

Used 10-B attachments from 10-B #14755.
Like new backhoe attachment—$750.
Standard 28' dragline boom—$100.
Dragline Fairlead—$100.
¾ Yard dragline bucket—$100.
Shovel front, fair condition—$150.

McCANDLESS CONSTR. CO.
1750 Kearney Street Springfield, Missouri

5000 s.f. of slightly used Atlas Speed Forms; attractively priced. Charter Oak Construction Co., Inc., 525 Main Street, Hartford, Conn.

MISCELLANEOUS EQUIPMENT

1—16" DREDGE.
1—24" DREDGE.
1—20" DIESEL DREDGE PLAIN SUCTION. STEEL HULL.
1—12" DREDGE PUMP DIRECT CONNECTED TO A 300 H.P. MOTOR.
1—80 K.W.F.M. D.C. FAIRBANKS MORSE MODEL 41 GENERATING SET.
1—STEEL BARGE 70x30x7.

H. P. GUION
6050 Riverdale Avenue
New York 71, N.Y.
Phone: Kingsbridge 9-8245 or 9-8246

New 18" dredging pump, rectangular cross section casing, high alloy steel liners, high alloy cast steel 4 vane runner; spare liners. Box 3587

POSITION WANTED

Superintendent available; 30 yrs. experience and qualifications covering all types of sewers, water lines, highways, airports, heavy and light excavating, earth fill dams; know cost, plans and specifications, materials, labor and modern equipment; honest, sober and reliable; best of health and a pusher; available for any part of the U.S.A. Box 3684

HELP WANTED

EXPERIENCED EXCAVATOR SERVICEMAN FOR TRAVEL IN LATIN AMERICAN COUNTRIES

PROMINENT EXCAVATOR MANUFACTURER HAS OPENING FOR CAPABLE MAN EXPERIENCED IN SHOVEL AND DRAGLINE OPERATION AND MAINTENANCE. MUST SPEAK SPANISH FLUENTLY. MUST BE AN AMERICAN CITIZEN AND WILLING TO TRAVEL. SEND COMPLETE INFORMATION ON BACKGROUND AND REFERENCES WITH RECENT PHOTOGRAPH TO EXCAVATING ENGINEER. BOX 3681

If you are Buying or Selling Used Equipment this is the place to let

the Excavating Industry know about it.

. super highways

. giant dams

. elaborate waterways

. new construction

HENDRIX Dragline Buckets
. . . very much in the picture

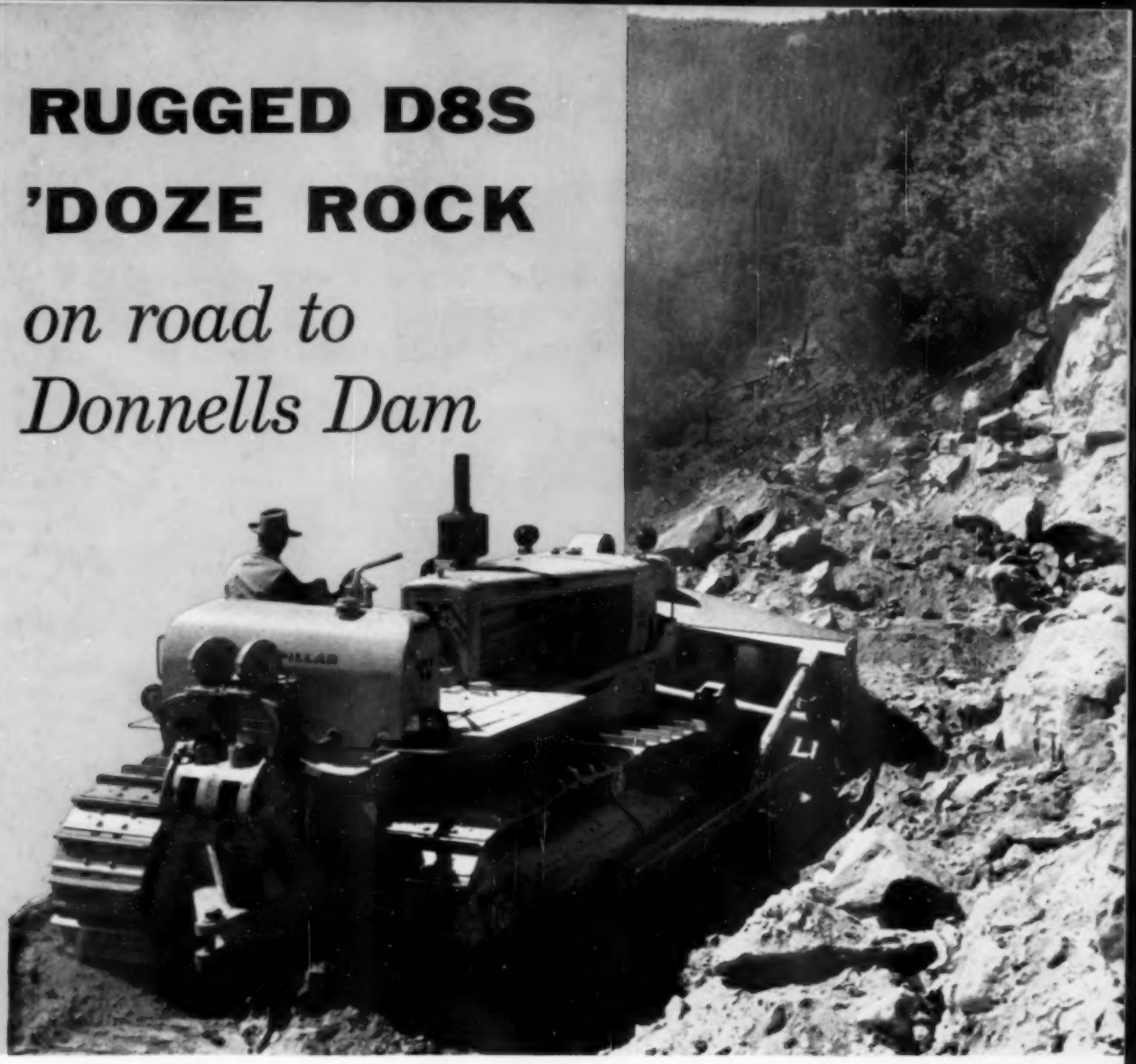
A TYPE FOR EVERY DIGGING PURPOSE ¼ to 40 Cubic Yards

Hendrix Lightweight Dragline Buckets

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

RUGGED D8S 'DOZE ROCK

on road to Donnells Dam



In rough mountain country above Strawberry, California, Tri-Dam Constructors are preparing for the $32,000,000 job of building Donnells Dam.

One of the first requirements is an 8-mile, 24-foot contour road leading up to the dam site and permanent camp. And most of the roadway has to be blasted out of steep granite slopes like the one pictured. Handling shot rock on locations like this takes tough equipment. That's why Tri-Dam is using CAT* D8 Tractors with No. 8S Bulldozers. There are 9 of them working on the project.

The D8 has been known as "king of the crawlers" for years. As jobs grew bigger and tougher, the tractor has grown with them. Today's D8 is new from the ground up—bigger, tougher, more powerful than any earlier model. Look at these features:

- *New heavy-duty 4-cycle diesel engine delivering 191 HP at 1200 RPM.*
- *Choice of torque converter or direct drive.*
- *Oil clutch, for smooth performance and long work life.*
- *New 7-roller track frame and long-wearing "water quenched" track shoes.*
- *New, more powerful starting engine with "in-seat" starting.*
- *Better job visibility and greater operator comfort.*

Your Caterpillar Dealer will be glad to show you how this new D8 can increase your production. And you can depend on him for prompt service and original parts. Ask him for a demonstration today.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

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NAME THE DATE... YOUR DEALER WILL DEMONSTRATE